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Presents :

Dr. Ahmed Mowafi Chest Book

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Chest Scheme

Definition : Only in Bronchiectasis and COPD.

Etiology : لا يقرأ و لكن يؤلف

- Pulmonary
- Extra Pulmonary : → pleura.
 → mediastinum.
 → diaphragm.
 → sub diaphragmatic.

Pleural effusion.. = Pericardial effusion. ما عدا ← (١٢ حاجة)

Clinical Picture: (Symptoms, Signs & Complications)

A - Symptoms :

1. Asymptomatic.
2. Cough.
3. Dyspnea.
4. Pain... e.g: due to pleurisy.
5. (F.A.H.M.) Fever.. Anorexia.. Headache.. Malaise..
[The 1st symptom in case of infection]

NB: In Chest ptn Cough before dyspnea except I.P.F.
In Cardiac ptn Dyspnea before cough.
I.P.F. : interstitial pulmonary fibrosis.

6. In suppurative lung syndromes:

Sputum : - excessive.

(ه كلمات) - foetid.

- purulent.

- usually paroxysmal.

- usually positional, (mention position:

1- lung abscess on healthy side,

2- Bronchiectasis on leaning forward.)

B- Signs:

1- General:

- fever.
- tachypnea.
- tachycardia.

2- Local:

a. Inspection :

1. Shape

- bulge : (pleural effusion,
 emphysema, & hydrothorax).
→ retraction : (fibrosis, collapse).



2. Resp. movement

→ diminished on the affected side.

b. Palpation:

1. T.V.F. (diminished in all except 2 C

→ consolidation.

→ collapse.

- Gvity

2. Trachea:

- shift to i same side : fibrosis & collapse.
- to i opposite side : emphysema, bulging
- pneumothorax, hydropneumothorax & pleural effusion.

c. Percussion:

- normal → resonant.
- hyper-resonance → emphysema.
- lympanic (hyper-hyper) → tension-pneumothorax.
- dullness → collapse.
- fibrosis.
- consolidation.
- pleural effusion.
- stony dullness → massive pleural effusion.

d. Auscultation:

- Breath sounds.
- Adventitious sounds.
- Special sound.

1. Breath Sounds:

a. vesicular breath sound:

- normal.
- insp. : exp. = 3 : 1
- exp. → passive.

b. vesicular & prolonged expiration:

- insp. : exp. = 1 : 1
- exp. → active (bronchial narrowing)
- e.g.: Bronchial narrowing
- chronic bronchitis.
- C.O.P.D.
- bronchial asthma.
- bronchogenic carcinoma.

c. bronchial breath sound:

- there is a gap () insp. & Exp.
- gap → alveoli non functioning.
- e.g.:

- consolidation.
- collapse.

T.V.F.

Retraction

*L - Internal Medicine - Chest.***2. Adventitious sounds:**

- a. rub → dry pleurisy.
- b. ronchi → bronchial narrowing : e.g. :
asthma & bronchitis.
- c. crepitations → consolidation, bronchitis,
bronchiectasis, fibrosis,
& pulmonary edema.

3. Special sound:

- lung abscess → post-tussive suction.

C- Complications :

No complications ← كل الأمراض

C.O.P.D. & (pneumonia, lung abscess, bronchiectasis) ← ما عدا

Q - Complications Of C.O.P.D. (١٠ حاجات)**a. Chest :**

1. infection.
2. bronchiectasis.
3. bronchogenic carcinoma.
4. respiratory failure.
 - mentality disturbance.
 - asthria.
 - terminal coma.

b. Cardiac :

5. R.S.H.F.
6. L.S.H.F.

c. Renal :

7. proteinuria. (renal congestion → R.S.H.F).
8. salt and water retention. (↑ CO₂ → stimulation of
carbonic anhydrase enz. Inhibitor).

d. Stomach :

9. peptic ulcer.

e. Chronic cough (10.) :

▪ thoracic :

- rupture bullae.
- haemothorax.
- stress fracture → rib.
- rupture → aneurysm.

▪ extra thoracic :

- ↑ I.A.P. → hernia and prolapse.
- ↑ I.O.P. → retinal hge.
- ↑ I.C.P. → mycotic aneurysmal rupture.

▪ general :

- insomnia.
- exhaustion.

Q- Complications of (Pneumonia, lung abscess, bronchiectasis):

a. General :

- 1- Septicemia.
- 2- Septic shock.
- 3- Meningitis.
- 4- Amyloidosis.
- 5- Clubbing.
- 6- D.I.C. (disseminated intravascular co-agulation)

b. Pleural : *التهاب الجنه*

- 1- Pleurisy.
- 2- Effusion.
- 3- Pneumothorax.
- 4- Hydropneumothorax.
- 5- Empyema.

c. Lung :

- 1- Pneumonia.
- 2- Lung abscess.
- 3- Bronchiectasis.
- 4- Fibrosis.

*bronchiectasis**التهاب الجنه**pneumonia**التهاب الجنه**lung abscess**التهاب الجنه*

+ In bronchiectasis → - cor pulmonale
- R.F.

+ in pneumonia (unresolved) → - delayed resolution.
- incomplete resolution.
- A.R.D.S.
- R.F.

*Complication of bronchiectasis*Investigations :

أي كلام في أي اتجاه

1- Radiology :

- i. X-ray.
- ii. U/S → pleural effusion. *قط*
- iii. CT.

2- Lab. :

- i. sputum examination.
- ii. pleural fluid aspiration.
- iii. others : (HB % - E.S.R.)

blood

3- Invasive :

- i. bronchoscope.
- ii. thoracoscope.

hypoxia

4- Inv. For the cause : e.g. : T.B.

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Apprehensions

Ae	:	etiology
ch'	:	characterized
é	:	with
éout	:	without
i	:	the
T.V.F. :	:	tactile vocal fermentas.
-ve	:	negative.
+ve	:	positive.

*By /**Dr : Ahmed. Abd El- latif.*

Pleura

Anatomy of the pleura :

Divisions : 2 layers; both meet at the root of the lung.

- visceral pleura : covers the lung and fissures.
- Parietal pleura :
 - Costal pleura : covers the thoracic cage.
 - Diaphragmatic pleura : covers the diaphragm.
 - Mediastinal pleura : covers the mediastinum.

Appearance :

- smooth, glistening and semitransparent.

Blood supply :

- visceral pleura :
 - arterial supply : pulmonary arteries.
 - venous drainage : to the left atrium.
- Parietal pleura :
 - arterial supply : systemic arteries.
 - venous drainage : to the right atrium.

Lymphatics of the pleura :

- to the hilum of the lung.

Innervation of the pleura :

- 1- parietal pleura : supplied by both somatic and autonomic nerves.
 - a. costal pleura & peripheral part of the diaphragmatic pleura : intercostals nerves.
 - b. central part of the diaphragmatic pleura : phrenic nerve.
- 2- visceral pleura : supplied by autonomic nerves only, no pain fibers.

Pleural fluid :

- small volume of fluid is normally present.
- about 10-20 ml.
- its function is to lubricate the lung movement.

Pleural diseases : e.g.:

- Dry pleurisy.
- Pleural effusion.
- Pneumothorax.
- Pleural tumors.

Dry pleurisy

Def. : It is an inflammation of both layers of i pleura without effusion.

Ae. : = Exudative pleural effusion.

C/P. :

A. Symptoms :

1. Pleural pain (pleurodynia) : due to stretch of the inflamed parietal pleura.

➤ characters of pleural **pain** : حجاب ٧

- site : localized or generalized.
- radiation :
 - shoulder tip : via phrenic nerve when area over central tendon or diaphragm is affected.
 - upper abdomen : when area over peripheral diaphragm is affected.
- ch' : sharp, stitching or dull aching.
- duration : continuous.
- ↑ ed by :
 - coughing.
 - chest wall movement.
- ↓ ed by :
 - catching breath.
 - splinting i site of i lesion.
- ass. symptoms : dry pericarditis.

2. Dyspnea & dry cough.

3. Symptoms of the underlying condition :
e.g. : bronchiectasis.

B. Signs :

Pleural rub; due to friction of the rough 2 layers.

➤ characters of pleural **rub** :

- superficial.
- leathery.
- ↑ ed by pressure of i stethoscope.
- disappear é holding respiration.
- no fixed relation to i heart sounds.

Treatment :

- ❖ treatment of the underlying cause(s).
- ❖ analgesics to control the pain.

Pleural effusion

Def. : Inflammation of the pleura with accumulation of fluid in the pleural cavity.

Ae. : → ↑ exudate.
→ ↑ transudate.

A- ↑ exudate : (↑ ed capillary permeability.)

1. Infection.
2. Infarction.
3. Infiltration.
4. Iatrogenic.
5. Irradiation.
6. Idiopathic.
7. rheumatic fever.
8. rheumatoid arthritis.
9. renal failure.
10. post cardiectomy syndrome.
11. post traumatic.
12. collagen disease.

B- ↑ transudate :

- ↑ hydrostatic pressure : e.g. : HF.
- ↓ plasma oncotic pressure :
 - malnutrition (↓ protein intake.)
 - malabsorption .
 - liver cirrhosis.
 - nephritic syndrome.

Difference () exudate & transudate.

	exudate	transudate
Specific gravity :	> 1016	< 1016
Protein :	> 3 gm/dl	< 3 gm/dl
LDH :	> 200 IU/L	< 200 IU/L

Clinical picture :

Depends on:

- cause: inflammatory or non inflammatory.
- rate of fluid accumulation: rapid or slow.
- amount of fluid: large or small.

A- Symptoms :

1. Asymptomatic : small & slowly accumulated.
2. FAHM.

3. Pain.
 - a. stitching → pleurisy.
 - b. dull aching → massive pleural effusion.
4. Dyspnea.
5. Cough. (dry , recurrent).

B- Signs :

1. Inspection :
 - a. shape → unilateral localized bulge.
 - b. chest movement → ↓ on i affected side.
2. Palpation :
 - a. trachea : shifted to the other side in massive pleural effusion, unless;
 - i. underlying lung collapse.
 - ii. fixed mediastinum : central trachea.
 - iii. associated pleural fibrosis.
 - b. ↓ T.V.F.
 - c. ↓ chest expansion.
3. Percussion :
 - a. dullness → small amount.
 - b. stony dullness → massive amount.

N.B. : Scodiac sign : hyper-resonance above the level of the effusion due to compensatory emphysema.

4. Auscultation :
 - a. breath sound :
 - i. vesicular breath sound : ↓ or absent.
 - ii. bronchial breath sound é or éout aegophony (at the upper border of the effusion).
 - b. adventitious sound :
 - rub** → superficial .
 - leathery.
 - not related to i cardiac cycle.
 - ↑ by pressure with stethoscope.

N.B. : differs from pericardial rub : disappear with holding respiration.

D.D. of multiple -ve signs :

	Effusion	Collapse	Fibrosis
Percussion :	Stony dullness.	Dullness.	Dullness.
Trachea :	Opposite	Same	Same
Opacity :		Homogenous	Heterogeneous.

Investigations for pleural effusion :**1- Radiological examination :****a- plain chest X-ray :**

- Small amount : homogenous opacity obliterates costophrenic angle.
- Larger effusion : rising to the axilla.
- Massive pleural effusion : shift of mediastinum to i same or i other side.
- Encysted pleural effusion : D-shaped or inverted D-shaped opacity.
- Fissural effusion : rounded or oval homogenous opacity at i site of i fissure.
- Sub-pulmonary effusion : elevation of the diaphragmatic cupola.
- Mediastinal effusion : broad mediastinum.

b- ultrasound of the chest :

- can detect up to 200 ml. of fluid.

c- C.T. of the chest.**2- Diagnostic aspiration : for each of the following purposes :**

- a- biochemical analysis : to differentiate () exudative and transudative pleural effusion :

parameter	Exudates	Transudate
1- pleural fluid protein	> 3 gm/dl	< 3 gm/dl
2- pleural fluid protein / serum protein	> 0.5	< 0.5
3- absolute LDH volume	> 200 IU/L	< 200 IU/L
4- pleural fluid LDH / serum LDH	> 0.6	< 0.6
5- specific gravity	> 1016	< 1016

Additional biochemical tests :

- **PH** of pleural fluid : PH < 6.8 often in empyema (pseudochylothorax)
 - **Glucose** in pleural fluids : normal pleural fluid glucose equal to that of the serum.
 - **Lipids** → chylothorax.
 - **Amylase** : it is high in effusion 2ry to pancreatitis, pancreatic tumors & oesophageal rupture.
- b- bacteriological examinations : pleural fluid culture for aerobic, anaerobic & ZN for T.B.
- c- cytological examination : for malignant cells, lymphocytes, neutrophils, eosinophils & other cells.

- 3- Pleural biopsy : for histological examination of i pleura.
- 4- Thoracoscopy.
- 5- Feature of the cause. e.g. : sputum → T.B.

N.B. : ↓ Pleural fluid glucose in

- Bacterial infection.
- RH. Disease.
- T.B. pleurisy .
- Malignant effusion.

Special types of pleural effusion :

1- Para pneumonic effusion :

- the most common cause of exudative pleural effusion is pneumonia.
- bacterial pneumonia is associated with pleural effusion in 40 % of cases.
- it may progress to empyema.

2- Tuberculous effusion :

- culture of pleural fluid is often -ve .
- pleural biopsy is diagnostic and shows a tuberculous granuloma in 2/3 of patients.

3- Empyema :

- it means presence of pus in the pleural space.
- causes : pneumonia, T.B., fungus & lung abscess
- treatment : antibiotic & intercostal tube drainage.

4- Malignant pleural effusion :

- due to pleural metastases, effusion blood stained & recur after aspiration.

5- Haemothorax :

- it means presence of significant amount of blood in pleural space.
- causes : chest trauma, iatrogenic, rupture of peripheral pleural adhesions & malignant pleural effusion.
- it maybe associated with pneumothorax.
- it is diagnosed when the HCV of pleural fluid > 50 % of peripheral blood.
- ttt of choice : intercostal tube drainage.

6- Post surgical pleural effusion :

- occur 2 - 3 days after upper abdominal surgery.
- It's usually small effusion and resolve spontaneously.

7- Chylothorax :

- presence of chyle in the pleural space.
- causes : disruption of the thoracic duct by :
- trauma : blunt trauma or iatrogenic.
- tumors : lymphoma, bronchial carcinoma or metastases.
- idiopathic.
- treatment : surgical repair, intercostals tube & chemotherapy for lymphoma.

Treatment of pleural effusion :**1- Treatment of the cause : e.g. :**

- anti T.B. for T.B.
- chemotherapy for malignant effusion.
- Antibiotics and postural drainage for lung abscess with effusion.

2- Pleural aspiration to relieve dyspnea.**3- Intercostal tube (ICT) for drainage for : haemothorax, empyema, chylothorax & hydropneumothorax.****4- Pleuridesis in case of : recurrent pleural effusion & recurrent pneumothorax.****5- Analgesics to relieve the pain.****Pleural aspiration:**

(4 x 3)

1- indications :

- a. huge amount. الكمية كبيرة
- b. blood or pus. النوعية حقيرة
- c. not respond to medical treatment. الاستجابة رديئة

2- value : relief of :

- a. respiratory distress.
- b. collapse.
- c. lymphatic obstruction.

3- complications :

- a. neurogenic shock.
- b. haemothorax.
- c. acute pulmonary oedema.

4- precautions :

- a. under anesthesia.
- b. site : just above the rib.
- c. gradual aspiration.

Pneumothorax

Def. : Presence of air in the pleural space.

Types :

A- Spontaneous pneumothorax :

1- 1ry spontaneous pneumothorax :

- in young patient é apparently healthy lung.
- It's caused by rupture of bleb into l pleura.

2- 2ry spontaneous pneumothorax :

- in patients é diseased lung, it is due to :

i. Lung disease :

- COPD.
- cystic fibrosis.
- bronchial asthma.
- pneumonia.
- TB.
- bronchogenic carcinoma.

ii. Chest wall infections :

- IPF.
- operations.

iii. Sub-diaphragmatic :

- sub-phrenic abscess.

iv. Others :

- Marfan's syndrome.
- drug abuse (cocaine or heroin).
- lung metastasis.

B- Traumatic pneumothorax :

1- Iatrogenic pneumothorax : it is either due to :

i. Diagnostic techniques : as

- pleural aspiration.
- biopsy.

ii. Therapeutic techniques : as

- mechanical ventilation.
- CVP.
- Percutaneous lung aspiration.

L - Internal Medicine - Chest.2- Traumatic pneumothorax :

- due to :
 - blunt trauma.
 - penetrating trauma.
- it is subdivided into 3 subtypes :
 - open.
 - closed.
 - tension pneumothorax.

C/P :A- Symptoms :

1. Pain : sharp unilateral pleural pain.
2. Dyspnea : depend on
 - i. condition of the underlying lung
 - ii. amount of air in the pleural space
3. Cough :
 - i. not common.
 - ii. dry.

B- General Examination :

1. Simple pneumothorax :
 - tachypnea.
 - tachycardia.
2. Tension pneumothorax :
 - i. must be taken seriously.
 - ii. suspected if there is :
 1. tachycardia, hypotension & cyanosis.
 2. patient is
 - anxious.
 - restless.
 - struggling for breath with signs of respiratory distress.

C- Local chest examination :1. Inspection :

- i. shape : normal, maybe
 - unilateral bulge.
- ii. respiratory movement (↑↓ed) on the affected side.

2. Palpation :

- i. trachea :
 - central.
 - may shift to → opposite side.
- ii. TVF: ↑↑ed.

*L - Internal Medicine – Chest.*3. Percussion :

- impaired note over the affected lobe.

4. Auscultation

- i. absent or diminished breath sound over the affected lobe.
- ii. adventitious sounds :
 - rub.

5. Small pneumothorax may not be detected clinically.

Investigations :

1- Arterial blood gases : hypoxemia & hypocapnea.

2- Chest X-ray :

- a. In tension pneumothorax : the mediastinum is shifted to the other side.
- b. Distinct visceral pleural line and absence of lung markings outside this line.
- c. Small pneumothorax may be visible by :
 - expiratory film.
 - lateral decubitus film.

Treatment :

1- Conservative ttt :

➤ Indication

- in healthy adult.
- not breathlessness.
- volume of pneumothorax is less than 20 %.

2- Active management:

➤ It is done by insertion of intercostal tube (ICT).

● Indications of ICT in pneumothorax :

- a) Tension pneumothorax.
- b) Bilateral pneumothorax.
- c) Large pneumothorax. > 20% of hemithoracic volume.
- d) Small but enlarging pneumothorax.
- e) Presence of dyspnea.
- f) Presence of pneumothorax with fluid.
- g) Underlying pulmonary disease.
- h) Patient on mechanical ventilation.
- i) Previous contra-lateral pneumothorax.

Pneumonia

Def. : Acute inflammation of the lung parenchyma.

Classifications of pneumonia :

(anatomical, etiological and clinical classifications.)

Anatomical Classification :

- Lobar pneumonia : involve one or more lobe.
- Bronchopneumonia (lobular pneumonia) : patchy, multifocal & bilateral.
- Segmental pneumonia : confined to a lung segment or segments.
- Sub segmental pneumonia.

Etiological classification :

1- Infectious causes :

a. bacterial pneumonia :

i. G +ve cocci :

1. pneumococcal pneumonia : i commonest 35%
2. Staph aureus pneumonia

ii. Gram -ve bacilli :

1. haemophilus influenza.

2. Legionella species.

3. Klebsiella.

4. pseudomonas aerogenosa

iii. rare causes : sterpl. Pyogens , rickettsia , plague , bacillus anthrax, tuberculous and nocardia.

b. non bacterial infectious pneumonia :

- i. viral pneumonia : influenza, measles, EBV, CMV, HSV, SARS & corona viruses.

- ii. fungal pneumonia : aspergillosis, candidiasis.

- iii. parasitic pneumonia : toxoplasma, etc.

- iv. Mycoplasma (bacteria like organisms.)

2- Non infectious causes :

- a. chemical pneumonia : lipid pneumonia; due to aspiration of oily material into the lungs, e.g. : aspiration of oil based nasal drops & smoke.

- b. physical pneumonia :
after radiotherapy of the chest.

- c. collagen disease.

- d. allergic.

Predisposing factors for pneumonia : any condition that :

- 1- Reduce or suppresses cough.
- 2- Impair mucociliary activity.
- 3- ↓↓ed activity of alveolar macrophages and neutrophils.
- 4- Splenectomy.
- 5- Liver cirrhosis, renal failure & D.M.

Root of infection : the potential pathogen reaches i lung by :

- 1- Inhalation.
- 2- Aspiration and micro-aspiration : from oro-pharyngeal contents.
- 3- Colonization : in the lower respiratory tract.
e.g. : COPD & bronchiectasis.
- 4- Blood spread.

Pathology of pneumonia : 4 stages :

- 1- Stage of congestion : with engorgement of the vessels → fine consonating crepitations.
- 2- Stage of red hepatization : there is intra-alveolar exudation (red cells and fibrin).
- 3- Stage of grey hepatization :
 - the exudation (WBCs) and liquefaction starts to take place → productive expectoration.
 - it shows non consonating crepitations.
- 4- Stage of resolution : the remaining exudates is absorbed or removed by the phagocytic system.

C/ P of classical lobar pneumonia :

a. **Symptoms** :

- 1- Asymptomatic.
- 2- Acute onset of fever (FAHM) + rigor,
delirium & may be
confusion.
- 3- Cough :
 - dry (at first).
 - productive of yellow or brownish rusty mucopurulent sputum.
- 4- Dyspnea in severe cases.
- 5- Chest pain : → pleuritic pain.

b. General examination :

- 1- Tachypnea and tachycardia;
respiration : pulse = 1 : 2 or 1 : 1 (normal = 1 : 4)
- 2- Temperature : 38.5 – 39.5 °C.
- 3- Face : كل الألوان الممكنة
 - hemolysis → jaundice.
 - cyanosis → cyanotic.
 - toxemia → pallor.
- 4- Working ala-nasi.

c. Local signs :**1- Inspection :**

- shape : normal, maybe;
 - unilateral bulge → effusion.
 - unilateral retraction → collapse.
- ↓↓ respiratory movement on the affected side.

2- Palpation :

- trachea : - central.
- may shift - opposite side → effusion.
- same side → collapse.
- TVF: ↑↑↑.

3- Percussion :

- impaired note or dullness over the affected lobe.

4- Auscultation :

- bronchial breathing and ↑ vocal resonance over i affected lobe.
- crepitations : fine late inspiratory crepitations
(stage of congestion), then
coarse inspiratory crepitations
(stage of grey hepatization and resolution).

Indices of severe pneumonia ; markers of severity :

- Altered mental state / confusion.
- Arterial hyper-capnea > 50 mmHg.
- Arterial hypoxemia PaO₂ ≤ 60 mmHg.
- Tachypnea ≥ 30 breath/min.
- Tachycardia ≥ 125 beat/min.
- Temperature ≤ 35°C.
- Evidence of renal insufficiency.
- Leukocytosis > 20.000 WBCs/ml. or
leucopenia < 4000 WBCs/ml.
- Chest radiograph show more than one lobe involved or rapid regression.
- Hypotension : systolic ≤ 90 mmHg &
diastolic ≤ 60 mmHg.

Q- Complications of Pneumonia:**a- General :**

- 1- Septicemia.
- 2- Septic shock.
- 3- Meningitis.
- 4- Amyloidosis.
- 5- Clubbing.
- 6- D.I.C.

b- Pleural :

- 1- Pleurisy.
- 2- Effusion.
- 3- Pneumothorax.
- 4- Hydropneumothorax.
- 5- Empyema.

c- Lung :

- 1- Lung abscess.
- 2- Bronchiectasis.
- 3- Fibrosis.
- 4- Unresolved pneumonia :
 - i. delayed resolution.
 - ii. incomplete resolution.
 - iii. A.R.D.S.
 - iv. R.F.

Investigations for pneumonia :**A- Radiological examination :**

- Lobar pneumonia : area of homogenous opacity & air bronchogram & ill defined shadow respecting lobar boundaries.
- Bronchopneumonia :
 - bilateral patchy consolidation with ill defined nodular shadows
 - staph pneumonia : abscesses & pneumatocoles.
- Other radiological pictures :
 - o reticulonodular shadow; due to viral pneumonia.
 - o nodular infiltrates : fungal or T.B. granuloma.
 - o radiological signs of complications : accompanied pleural effusion & lung abscess.

B- Detection of offending micro-organism :**1. Sputum examination :**

a. Gram's stain : absence of organism denote → legionella, mycoplasma, coxilla, viral pneumonia, T.B., or fungal pneumonia.

b. special stain :

- Zeihl-Nelsen → T.B.
- Fungal wet mounts smear → fungal infections.
- Wright stain → aspergillus infection.
- Giemsa → pneumocystis carinii.

c. sputum immuno-detection : → pneumococcal Ag. By :

- latex & ▪ ELISA.

d. sputum culture.

2. Invasive methods:

- a. nasal or nasopharyngeal washing or swabs → viral infection.
- b. blood culture : +ve in 10-30% of bacterial pneumonia.
- c. pleural fluid culture.
- d. trans-tracheal aspirate.
- e. fiber optic bronchoscope.
- f. pre-cutaneous needle aspiration. (CT guided)
- g. open lung biopsy.

3. Serological tests :

- ELISA, Latex agglutination test.

C- Blood Examination :**1. WBCs count:**

- a. leukocytosis.
- b. leucopenia.
- c. lymphocytosis.

2. Blood urea & creatinin.**3. Liver function test.****4. Serum electrolytes : hyponatremia in legionella.****5. Blood culture.****D- Arterial blood gas (ABG) analysis :**

- 1. O₂ saturation is screened at 1st by pulse oxymetry followed by ABG analysis.
- 2. If PaO₂ < 60mmHg or PaCO₂ > 50mmHg → assisted ventilation may become necessary.

TTT of pneumonia. :**1. Choice of i specific antibiotic regimen :****a. Not severely ill patient :**

- i. I.V. benzyl penicillin or macrolide (penicillin allergy)
- ii. Inadequate response add one of i following :
 1. azithromycin (macrolide).
 2. ciprofloxacin.
 3. 2nd generation cephalosporin.
 4. amoxicillin.

b. Severely ill patient :

- i. 3rd generation cephalosporin (ceftazidime).
- ii. Amino glycoside.
- iii. Piperacillin.

c. Sever risk factors (hospital acquired) :

- i. Amino glycoside.
- ii. Plus one or more of I following :
 1. antipseudomonal penicillin(Gentamycin).
 2. antipseudomonal 3rd generation cephalosporin.
 3. ciprofloxacin.
 4. β -lactam impenem.

2. Supportive ttt :

- a. Fluid & electrolyte replacement.
- b. Corticosteroids → shock.
- c. Inotropic drugs : dopamine & dobutamine → shock.
- d. T.P.N. → sever cases.
- e. Respiratory support :
 - i. sufficient inspired O₂ to correct hypoxia.
 - ii. mechanical ventilation :
 1. PaO₂ < 60mmHG.
 2. rising PaCO₂ or PaCO₂ > 50mmHg.
 3. respiratory acidosis.
 - iii. postural change → improve oxygenation.

3. Other problems :

- pleuritic pain : some analgesic.

Atypical pneumonia :

- Caused by organisms devoid of cell walls,
 • Can't be detected by ordinary sputum staining.
 • Need specific policy in ttt.
 • E.g. : Legionella, Mycoplasma, Chlamydia,
 viral, T.B. & staph.

Organism	Special criteria	ttt
Staph.	▪ Hemoptysis. ▪ Lung abscess.	▪ Vancomycin. ▪ Ox ▪ Clox acillin. ▪ Diclox
Legionella	▪ Leukocytosis → lymphocytosis. ▪ Meningitis. ▪ Hyponatremia.	▪ Azithromycin. ▪ Ciprofloxacin.
Mycoplasma	▪ Interstitial pneumonia. ▪ Minimal signs. ▪ Very severe symptoms → marked toxemia, <i>lymphadenopathy, splenomegaly</i>	▪ Ciprofloxacin. ▪ Azithromycin.
Viral	▪ Severe illness. ▪ Slight local symptoms. ▪ Minimal signs. ▪ X-ray → ground glass appearance.	▪ Antiviral. ▪ Supportive ttt.
Klebsiella	▪ Apical lung affection.*	▪ Cephalosporin (3rd generation) ▪ Ciprofloxacin.

N.B. :

- community acquired pneumonia (CAP).
 - i. pneumonia occurring in i community
 - ii. e.g. : pneumococcal pneumonia.
- Hospital acquired pneumonia (HAP)
 - i. pneumonia occurring after 2-3 days of hospital admission
 - ii. e.g. :
 - pneumococci.
 - staph.
 - G-ve bacilli :
 - Klebsiella
 - Pseudomonas
 - H. influenza.

Chronic lung abscess

Def.: A localized area of parenchymal destruction in which infection by pyogenic organism results in tissue necrosis, supuration & cavity formation.

Ae.: (1ry & 2ry)

- 1ry : (aspiration lung abscess)
 - inhalation of septic material.
 - child → foreign body.
 - adult → during or post operative.
 - absent cough reflex.
- 2ry :
 - lung : (2p & 2b)
 - pneumonia.
 - bronchiectasis.
 - bronchogenic carcinoma.
 - PU. Infarction.
 - mediastinum :
 - osteomyelitis.
 - oesophagitis.
 - diaphragm :
 - sub-phrenic abscess.
 - blood :
 - pyemia :
 - T.B.
 - pyelonephritis.
 - infective endocarditis.

Types of lung abscess :

- Number :
 - single.
 - multiple.
- Site :
 - in aspiration lung abscess:
 - Rt lung > Lt lung (bronchus wider & in line é trachea.)
 - dependent (-apical segment of lower lobes. - post. Segment of Rt upper lobe.)
 - in heamatogenous lung abscess :
 - any part of the lung ----> usually basal.
 - in malignant lung abscess :
 - at the site of the tumor.

Na sser-plastic
& yahoo

Duration :

- acute.
- chronic (> 6-8 weeks of proper treatment out healing & é open cavity.)

pathogenesis :

- It starts as area of pneumonia in which small zones of necrosis or microabscess coalesce to form a single cavity → reach a size > 1 cm. (abscess).
- Inflammation erodes the adjacent bronchi & so suppuration is expectorated & air finds its way to abscess cavity → fluid air interference.

Pathology :

- Stage of pneumonia.
- Stage of acute abscess :
 - necrosis & liquefaction.
 - thin wall.
 - contains greenish grey foul-smelling pus.
 - collapsible.
- Stage of chronic abscess :
 - thick wall.
 - surrounded by fibrous tissue.
 - smooth.
 - regular.

C/P :

I- Pneumonic stage = pneumonia → localized.

II- Acute abscess :

A – Symptoms :

1- Suppurative lung syndromes:

Sputum : - excessive.

(ه كليات) - foetid.

- purulent.

- usually paroxysmal.

- usually positional, (mention position:

→ lung abscess on healthy side.)

2- (F.A.H.M.) Fever...é rigors.

3- Cough.

4- Dyspnea.

5- Pain...due to

- pleurisy.
- chronic cough.
- pneumonia.

6- Haemoptysis (may occur & may be massive.)

B - signs :**1- General :**

- fever. - tachypnea. - tachycardia.
- loss of weight. - loss of appetite.

2- Local : (signs of cavity = consolidation)**1- inspection :**

- shape : normal, maybe;
 - unilateral bulge → effusion.
 - unilateral retraction → collapse.
- respiratory movement (↑↓) on the affected side.

2- palpation :

- trachea :
 - central.
 - may shift to
 - opposite side → effusion.
 - same side → collapse.
- TVF: ↑↑ed. → on superficial abscess

3- percussion :

- impaired note over the affected lobe.

4- auscultation :

- bronchial breathing over the affected lobe.
- adventitious sounds :
 - crepitations.
 - rub.
 - rhonchi.

III- Chronic abscess :**A - Symptoms :**

- 1- deterioration of the general health :
 - loss of weight & appetite. ▪ cachexia.
- 2- suppurative syndrome.
- 3- retention syndrome. الكلمة المضنية

B - Signs :

(signs of cavity = consolidation.)

Complications of lung abscess :**a- General :**

1. Septicemia.
2. Septic shock.

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3. Meningitis.
4. Amyloidosis.
5. Clubbing.
6. D.I.C.

b- Pleural :

1. Pleurisy.
2. Effusion.
3. Pneumothorax.
4. Hydropneumothorax.
5. Empyema.

c- Lung :

1. Pneumonia.
2. Bronchiectasis.
3. Fibrosis.

Investigation : → ③1- Rad. :a- X-ray :

- i. before rupture : dense shadow.
- ii. later on → cavity é fluid level.
 1. thin wall → acute.
 2. thick wall → chronic.

b- C.I. :

- suspected bronchial carcinoma.

2- Lab. :a- Sputum exam. :

- Gram-stain.
- ZN stain.
- culture.

b- Sputum cytology

- malignant cells.

c- Blood picture :

- leucocytosis.
- anemia.

3- Bronchoscopy :• Diagnostic :

- foreign body.
- tumor.
- inspissated secretion.

• Therapeutic :

- aspiration of secretion.
- instillation of antibiotic.
- FB extraction.
- palliative ttt of carcinoma é laser or cryotherapy.

Differential Diagnosis :

- 1- Other causes of suppurative syndrome

L. - Internal Medicine - Chest.2- Other causes of cavitary lesions :

- a. Localized pyopneumothorax.
- b. Empyema é bronchopleural fistula.
- c. Bronchial carcinoma.
- d. Ruptured hydatid cyst.
- e. Hiatus hernia.

N.B : difference () lung abscess & pneumonia :

- pneumonia : → one organism.
- lung abscess : → multi-organism.

Treatment :1- Prophylactic :

- proper attention to i etiological factors.

2- TTT of acute lung abscess :a. antibiotic : (to cover the spectrum of G.+ve , G.-ve , anaerobic organisms)

- G +ve → penicillin G or 3rd generation cephalosporin
- G -ve → amino-glycosides.
- anaerobic → metronidazole.

b. postural drainage.c. bronchoscopic aspiration & instillation of antibiotic.d. Symptomatic ttt :

- analgesic.
- expectorant.

e. Rest , good nutrition é high protien diet.3- TTT of chronic lung abscess :

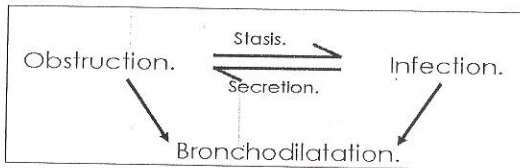
- o continue i medical ttt for another 6 weeks.
- o surgical ttt :
 - serious haemoptsis.
 - ailed medical ttt.

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Bronchiectasis

Def. : Persistent dilatation of bronchi & bronioles é suppurative infection.

Ae. :



Pathogenesis :

- Infection → affect i elastic fibers of i bronchi.
- Obstruction :
 - Complete → accumulation of secretion
 - dilatation of i bronchi.
 - Partial → accumulation of air.

Causes :

- Infection :
 - Congenital :
 - immunodeficiency.
 - Acquired :
 - T.B.
 - pneumonia.
 - lung abscess.
- Obstruction :
 - Congenital :
 - immotile cilia syndrome : *مشر عاذو عادي* → *سرج ساذو*
 - otitis media.
 - sinusitis.
 - infertility.
 - bronchiactasis.
 - Kartagner's syndrome :
 - bronchiactasis.
 - sinusitis.
 - dextrocardia or situs inversus.
 - Young's syndrome : (obstructive azospermia.)
 - Acquired :
 - inside → foreign body.
 - wall → bronchial wall stenosis.
 - outside → L.N., tumor & compression.

L - Internal Medicine - Chest.Pathology : (site , shape , جوه , برة)

• Site :

- bilateral. (Lt > Rt)
- basal. (may be apical : patchy → حبيبية وقتاً من سطح)
→ T.B. → bronchiectasis cica heamorrhagic.)

• Shape :

- cylindrical.
- fusiform.
- saccular.
- varicose.

Suppurative
syndrome

- Inside → pus.
- Outside → fibrosis & collapse around i bronchi.

C/P :chronic
disease

causes of collapse

causes of bronchiectasis

A - Symptoms :

1- Suppurative lung syndromes:

Sputum : - excessive.

(أو كلمات)

- foetid.
- purulent.
- usually paroxysmal.
- usually positional. (mention position :
→ Bronchiectasis.. on leaning forward.)

2- Hemoptysis :

→ 50% due to ulceration of the blood vessel.

3- Cough.

4- Dyspnea.

- 5- Pain...due to
- pleurisy.
 - chronic cough.
 - pneumonia.

6 - (F.A.H.M.) Fever...é rigors.

7- Sinusitis : (concomitant → some cases.)

N.B. Bronchiectasis cica heamorrhagic :

- Hemoptysis éoul suppration.
- Cica = dry.
- Apical.
- Mostly T.B.

B - Signs :

1- General :

- Chronic → loss of weight
- fever.
 - tachypnea.
 - tachycardia.
 - puffy eye lid.
 - clubbing.
 - edema L.L. → hypoproteinemia.

3 ورم

فوق

نص

تحت

L - Internal Medicine - Chest.N.B.: Chest disorders associated é clubbing:

- i. Bronchiectasis.
- ii. Lung cancer.
- iii. Pulmonary fibrosis.
- iv. T.B.
- v. COPD.
- vi. Cystic fibrosis.

bilateral
basal
patchy

2- Local: (signs of cavity = consolidation)

1- Inspection:

- shape:
 - normal, maybe;
 - unilateral bulge → effusion.
 - unilateral retraction → collapse.
- respiratory movement (↑↓) on the affected side.

2- Palpation:

- trachea:
 - central.
 - may shift to
 - opposite side → effusion.
 - same side → collapse.
- TVF: ↑↑ed.

TVF ↑ → ⊖ bronchial sounds

3- Percussion:

- impaired note over the affected lobe → patchy

4- Auscultation:

- bronchial breathing over i affected lobe.
- adventitious sounds:
 - crepitations: → early.
 - mid-insp.
 - rub.
 - ronchi.

Complications of bronchiectasis:

a- General:

1. Septicemia.
2. Septic shock.
3. Meningitis.
4. Amyloidosis.
5. Clubbing.
6. D.I.C.

b- Pleural:

1. Pleurisy.
2. Effusion.
3. Pneumothorax.

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4. Hydropneumothorax.
5. Empyema.

c- Lung :

1. Pneumonia.
2. Lung abscess.
3. Fibrosis.
4. Cor pulmonale.
5. R.F.

Investigation :*Respiratory failure*1- Rad. :a- X-ray :

- i. normal or ↑ed bronchopulmonary markings.
- ii. tooth paste appearance : filled bronchi.
- iii. tram line appearance : evacuated bronchi.
- iv. cystic changes (soap bubble appearance): cystic type.
- v. honey comb appearance.
- vi. complication.

b- C.I. :c- Bronchography :

- the gold standard technique.
- difficult.
- great discomfort to patient.

2- Sputum :

- Gram stain.
- culture.

3- Bronchoscope : (evaluate i proximal airway.)

- assess i cause & site of hemoptysis.

4- Pulmonary function tests :

- pre-operative evaluation.
- reveal obstructive or restrictive or combined patterns.

5- Others :

- a- blood picture : leucocytosis.
- b- X-ray nasal siuses → - absent. -itis.
- c- ECG : dextrocardia in Kartagener's.
- d- hypogammaglobinemia.
- e- biopsies : - testis. - bronchial mucosa.
- nasopharynx.
- f- sweet test → ciliary dyskinesia syndrome.

Differential Diagnosis :1- Other causes of bronchorrhea :

- Chronic bronchitis :
 - smoker.
 - ch. productive cough (3m x 2y).
 - not related to posture.

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- Lung abscess, cystic lung, empyema & broncho-pleural fistula.
- Alveolar cell carcinoma :
 - watery expectoration.
 - diagnosed by biopsy & sputum cytology
- Bronchial asthma :
 - recurrent attack of wheezes, cough & expectoration.
 - not related to posture.

2- Other causes of haemoptysis :

- T.B.
- Bronchial carcinoma.

Treatment :1- Prophylactic :

- vaccination against measles, mumps & rubella.
- ttt of pneumonia or other chest infections.

2- Medical ttt :

- It is the main line of therapy in bronchiectasis:

- **antibiotics** : *→ especially ciprofloxacin & cephalexin*
- full dose for prolonged periods
- according to the culture & sensitivity.
- **chest physiotherapy.**
- **postural drainage** : *→ leaning forward*

- very important in bronchiectasis.

• **bronchodilators** : *abstraction where above dilatation if there are wheezes.*

- **haemostatic drugs** :
in cases of haemoptysis.

- **expectorants.**
- **deodorants.**
- human gamma globulin in hypogammaglobulinemia.
- ttt of complications.

3- Embolic therapy :

- in massive haemoptysis *→ to control bleeding.*
- done by injecting sclerosing material in the feeding bronchial artery.

4- Surgical excision :

- localized lesions.
- Severe threatening symptoms as
 - massive haemoptysis
 - excessive suppuration.

Infected cystic lung

Def. : Developmental anomaly of the bronchial tree with abnormally dilated bronchial wall caliber with bronchial cyst formation.

Pathology: it has 2 forms :

- 1- Central congenital cyst :
 - it is usually solitary with lack of connection é either the patent bronchus or alveoli.
- 2- Peripheral congenital cyst :
 - i. it is frequently multiple & connected with the rest of the bronchial tree and the alveoli.
 - ii. If infection occurs in these cysts, it will resemble cystic bronchiectasis with suppurative lung syndrome.

C/P :

▪ Age : usually child, sometimes adulthood.

▪ Symptoms :

1. Asymptomatic : if no infection & no connection with bronchial tree (central type).
2. Infection : suppurative syndrome & pyaemia.
3. Spontaneous pneumothorax.
4. Hemoptysis.

▪ Signs :

similar to those found with lung abscess or bronchiectasis (mention).

▪ Complications : e.g. : spontaneous pneumothorax

D.D. :

Other causes of suppurative lung syndrome, chronic bronchitis and T.B.

Investigations :

- 1- Sputum bacteriology : culture and sensitivity.
- 2- X-ray : soap-bubble appearance.
- 3- Bronchogram : cystic dilatation.
- 4- CT of the chest.

Treatment :

- Medical : antibiotics and postural drainage.
- Surgical : in single central cyst or localized peripheral lung cysts.

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Empyema with bronchopleural fistula

Def. : Pus in the pleural space or infected pleural fluid with fistula (opening) between the pleural space and the bronchial tree.

- it may be • acute or • chronic.
- it may be • loculated or • free.

Causes :

- 1- Direct spread from adjacent bacterial pneumonia.
- 2- Rupture of a lung abscess into the pleural space.
- 3- Invasion from subphrenic collection either
 - pyogenic or - amoebic.
- 4- Traumatic penetration.
- 5- Blood or lymphatic seeding.

C/P :

- Pneumonia → prolonged fever and chest pain or prolapse of i same symptoms.
- Dyspnea
- It is characterized by
 - postural cough.
 - big amount of expectorated pus.
- Chronicity : pallor, malaise, weakness, easy fatigability, fever, anorexia & weight loss.
- Clubbing and pleural rub.

Investigations :

- 1- Chest X-ray : Hydropneumothorax.
- 2- CT chest : the condition of the underlying lung.
- 3- Thoraco-centesis :
 - foul smelling aspirate (anaerobic infections).
 - Gram stain and culture sensitivity : identification of the causative organisms.
 - low PH (< 7.2).
 - pleural fluid white cell count > 15.000 / mm³.

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4- Methylene blue test :

- injection of methylene blue 1% in the pleural space
→ it is expectorated in the sputum.

5- Inhalation of radioactive isotopes : it will be detected in the pleural space.

Treatment :

- 1- Appropriate antibiotic therapy.
- 2- Intercostals tube drainage under water seal.
- 3- Pleuropneumectomy.

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Pulmonary tuberculosis

Causative organism :- tubercle bacilli, which are of 2 types :

- | | | |
|----------|----|--|
| Typical | :- | mycobacterium T.B. (human type) |
| | | M. bovis & M. africanum. |
| Atypical | :- | affect patients with pre-existing lung disease or suppressed immunity. |

About T.B. bacilli :

- non motile, non spore forming & non capsulated organism.
- not prevented from entering room airway by covering mouth & nose during coughing.
- remains viable for 13 yrs in sealed culture tubes.
- dried bacilli kept in dark may remain viable for few months.
- susceptible to :
 - direct sunlight is lethal to T.B. bacilli within 5 min. & indirect within 1-2 hours.
 - heat :- 1 min. boiling & 10-15 min. at 65-70°C → lethal.
 - phenol 4% & alcohol 70% is lethal.
 - ultraviolet radiation.

Factors relevant for development of tuberculosis :-

- i. Sources :
 - a. repeated productive cough.
 - b. nocturnal cough ↑ % of their threshold contact.
 - c. tenacious sputum is more infectious than watery sputum.
 - d. on effective chemotherapy is much less infectious.
- ii. Myobacterial factors :
 - a. no. of bacilli.
 - b. virulence of organism.
- iii. Host :
 - a. race : more in negroes.
 - b. age : adolescent, old age.
 - c. environmental :
 - i. silica workers
 - ii. overcrowding.
 - iii. direct contact with cases.
 - d. habits : alcohol & smoking.
 - e. immunosuppression :
 - i. steroids & cytotoxic drugs.
 - ii. diabetes.
 - iii. after gastrectomy & malnutrition.

The sources of infection :

- Human :
 - droplet infection.
 - mother to fetus.
- Animal :
 - milk.
 - other excreta.

Transmission of infection:

- coughing.
- sneezing.
- spitting.
- other resp. maneuvers.

Routes of infection : (sites of 1ry)

Respiratory tract is the most frequent.

Other routes : G.I.T., skin, mucous membrane, placenta.

Pathology of T.B. :

It affects any organ in i body, but most frequently it involves i lung .

The hallmark of active T.B. is tubercle :

- i. the predominant cells are non-lymphoid mononuclear cells.
- ii. epitheloid cells.
- iii. Langhan's giant cells.
- iv. central cyanosis.

Pathologically ; T.B. **reaction** may be :

- i. Proliferate :
 - usually in 1ry form.
 - ch' by proliferation of histocytes, Epitheloid, giant cells, cap., fibroblast.
 - necrosis is usually superimposed.
- ii. Exudative :
 - usually in 2ry form.
 - ch' by accumulation of fibrin, neutrophils & macrophages.
- iii. Combined : more common.

Types of pulmonary T.B. :**1. Primary T.B.****a. Components of 1ry complex :**

- i. Ghon's focus : T.B. granuloma occurs in sub pleural position above or below i lobar fissure in i upper & lower lobes.
- ii. lymphangitis.
- iii. lymphadenitis.

b. Fate of 1ry complex :

- i. healing éout clinical manifestation → 90% of cases
 - resistance high.
 - virulence low.
- ii. spread to other parts of i lung or organs → 10%
 - resistance low.
 - virulence high.

Spread may lead to :

- 1) enlargement of the Ghon's focus : lead to
 - T.B. pneumonia
 - T.B. pleurisy.
 - cavitations.
 - blood spread.
- 2) minimal bronchogenic spread.
- 3) massive bronchogenic spread.
- 4) T.B. pleurisy é effusion.
- 5) L.N. spread:
 - into bl. Vessel : miliary T.B.
 - into a bronchus : segmental consolidation.
- 6) ulceration into a bronchus.

2. Post primary T.B. : infection may be :-**a. Endogenous :- due to**

- i. progression of 1 1ry lesion.
- ii. reactivation of a healed 1ry focus.
- iii. hématogenous spread.

b. Exogenous :- (reinfection), sites are i upper lung zones due to high V/P ratio.**Different types of lesions :****1. Fibrotic type :**

- small lesion that pass rapidly to fibrosis.

2. Chronic fibro-caseous type :

- moderate dose of bacilli & moderate immunity.
- draining L.N. are not affected.
- complications of cavitary T.B. :-
 - héamoptysis.
 - T.B. effusion.

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- pneumothorax.
 - T.B. laryngitis.
 - intestinal T.B.
 - pyopneumothorax.
 - T.B. tonsillitis.
 - hematogenous T.B.
3. Tuberculous bronchopneumonia :
 - it is a fatal condition.
 - large dose of bacilli & low immunity.
 - draining L.N.s are involved & Hematogenous form occurs.
 4. Miliary T.B. :
 - due to rupture of a caseous pulmonary focus into a blood vessel.
 5. T.B. bronchitis :
 - due to encroachment on bronchi by affected L.N.s & caseous material.
 6. Collapse of 1 lung or even sudden death by suffocation :
 - due to rupture of caseous glands into trachea or major bronchi.

Hematogenous spread of T.B. :-

A. Intrathoracic lesions :-

a. Pulmonary :

- i. multiple T.B. cavities.
- ii. miliary T.B.
- iii. Simon's foci : upper lobe lesions & small tubercles in apices of 1 lung.
- iv. cortico-pleural T.B.
- v. tuberculoma .
- vi. T.B. pneumonia.

b. Extra pulmonary :

- i. pleura → pleurisy & effusion.
- ii. pericardium → pericardial effusion.
- iii. L.N.s → hilar adenopathy.

B. Extrathoracic lesions :-

- a. Meninges → meningitis.
- b. C.N.S. → tuberculoma of brain.
- c. Spine → Pott's disease.
- d. L.N.s → T.B. lymphadenitis.
- e. Urogenital → urogenital T.B.
- f. Joints: → T.B. of joints.
- g. Serous membrane → T.B. peritonitis &
→ Cancato's disease (T.B. polyserositis).

C/P :

T.B. presents é any/or no symptom & any /or no signs.

i. Primary T.B.**A. Symptoms :**

1. Asymptomatic.
2. Failure to thrive, anorexia, low grade fever.
3. Cough : not common.
4. Expectoration : rare in children.
5. May be erythema nodosum or phlyctenular conjunctivitis

B. Signs:

1. General : debilitated in sever cases.
2. Local :

- | | |
|------------------------------------|----------------------------------|
| a. inspection. | consolidation
or
collapse. |
| b. palpation. | |
| c. percussion. | |
| d. auscultation : | |
| i. crepitations. | |
| ii. wheeze | |
| iii. D'espine sign (may be +ve.). | |

ii. Miliary TB.**A. Symptoms :**

1. Sever toxemia é dyspnea, cough & tachycardia.
2. Headache & neck rigidity.

B. Signs :

1. Spleen & liver are usually enlarged.
2. Choroidal tubercles may be detected on fundus exam.
3. Chest crepitations.
4. X-ray → fine miliary shadows over both lungs.

iii. Post primary T.B.**A. Symptoms :**

1. Asymptomatic.
2. General :
 - a. tiredness & maiaise.
 - b. loss of weight, loss of appetite.
 - c. night fever & night sweat.
 - d. recurrent cold.
 - e. may be amenorrhea in females.
3. Chest : (no or any.)
 - a. cough : persistent.

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- b. expectoration :
 - mucoid.
 - purulent.
 - blood stained.
- c. haemoptysis.
- d. chest pain.
- e. wheezes.

B. Signs :

1. No signs.
2. General :
 - pallor.
 - cachexia.
 - fever.
 - tachycardia.
 - ↑ R.R.
3. Chest :
 - a. cavity signs.
 - b. Localized wheezes.
 - c. Consolidation, collapse & fibrosis.
4. Other body systems : T.B. lesions.

Investigations of T.B. :

1. Rad. :

a. Features :

- i. upper zone infiltration (uni or bi).
- ii. cavitation &/or calcification.
- iii. miliary shadow ± pleural effusion.
- iv. abnormal shadows for weeks é ttf.

b. Value :

- i. early detection of T.B.
- ii. extent of T.B. lesions :
 1. minimal :
 - not extend beyond 2nd rib.
 2. moderate :
 - not exceed 1/3 lung vol.
 - not extend beyond 4th rib.
 - total cavity diameter < 4c.m.
 3. far advanced :
 - extend beyond 4th rib.
 - total cavity diameter > 4c.m.

2. Bacteriological exam. :

a. Collection of samples :

- sputum.
- laryngeal swab.
- bronchial lavage.
- gastric aspirate.

b. Exam. Of samples :

- i. Ziel Neelsen (Z.N.) stain.
- ii. culture :
 1. conventional media :
 - Lowentien Jensen.

- Liquid media.
- 2. radiometric media :
 - Bectec system.
- 3. culture & susceptibility testing.
- iii. P.C.R. (polymerase chain reaction).
- 3. Tuberculin test :
 - I.D. injection of 0.1 purified protein derivative (PPD) & i interpretation → 72 hrs.
 - +ve → suggests infection in patient not received BCG vaccination.
 - -ve → excludes T.B.
 - False -ve may be :
 - pre-allergic phase.
 - fulminant case (miliary)
 - steroid or immunocompromised
 - Technical.
- 4. Serological exam. :
 - E.L.I.S.A. → little use.
- 5. Blood exam. :
 - a. E.S.R. : usually elevated.
 - b. Blood picture : normocytic normochromic anemia
→ miliary T.B.

D.D. of T.B. :

- 1) Bronchial carcinoma :
 - o prolonged cough.
 - o hemoptysis.
 - o pleural effusion.
- 2) Pneumonia.
- 3) Other causes of Hemoptysis.
- 4) Other causes of prolonged fever & cough.

Complications & sequelae of pul. T.B. :

1. Pleural T.B.
2. Pulmonary fibrosis.
3. T.B. laryngitis.
4. Bronchiectasis.
5. Aspergilloma.
6. Massive Hemoptysis
7. Broncholith.
8. Cor-pulmonale.
9. Amyloidosis.
10. Bronchial carcinoma.
11. ARDS.
12. T.B. of other organs.

L - Internal Medicine - Chest.Treatment of T.B. :I. Prophylactic :A. Increasing host defenses :a. General measures :

- i. good nutrition & housing.
- ii. rest, sleep, fresh air & exercise.

b. Specific line by BCG :

- i. not prevent infection but can prevent i most sever forms of T.B.
- ii. vaccination → +ve tuberculin test.
- iii. given to all children in i 1st of life.

B. Prevention of infection :a. From sputum :

- i. case finding.
- ii. isolation & effective ttt of patients.
- iii. reduce i chance of infection :
 - better ventilation.
 - avoid over crowding.
 - stop smoking.
 - proper hygiene.

b. From milk :

- > pasteurization of milk.

II. Therapeutic :A. General :

- a. Follow up of treated patients.
- b. Resumption of work & rehabilitation.
- c. Prolonged bed rest is not essential.

B. Symptomatic :

- a. Anti-tussive.
- b. Vitamin K
- c. Anti-pyretic.

C. Specific :

- 1. Main principles.
- 2. Drugs (dose , side effects)
- 3. Regimen.
- 4. N.B. (T.B. & cortisone)
- 5. Specific situation.

القواعد الأساسية
الأدوية

1. Main principles (2P , 2C) :

- Prolonged course (6-9 m.)
- Proper dose.
- Continuous ttt.
- Combined drugs.

*L - Internal Medicine --Chest.***2. Drugs :**➤ 1st line : (R. E. S. P. I. ratory)

- Rifambicin. [R]
- Ethambutol. [E]
- Streptomycin. [S]
- Pyrazinamide. [Z]
- I.N.H. [H]

N.B. : I.N.H. → (isonicotinic acid hydrazide.)
 : pyridoxine 10mg/day & I.N.H. to prevent peripheral neuritis → (S/E of I.N.H.).

➤ 2nd line :

- Capreomycin.
- Kanamycin.
- Viomycin.
- P.A.S.
- Ciprofloxacin.

S/E (side effects) :

Drug	Side effects
Rifambicin.	▪ GIT irritation. ▪ hepatotoxic.
I.N.H.	▪ Idiosyncrasy. ▪ Neuropathy. ▪ Hepatotoxic
Ethambutol.	▪ Optic neuritis.
Streptomycin.	▪ Autotoxicity. ▪ Nephrotoxicity.
Pyrazinamide.	▪ Gout.

Dose :

- I.N.H. → 5 – 10 mg/kg BW/d.
- Rifambicin. → 10 – 15 mg/kg BW/d.
- Streptomycin. → 15 – 20 mg/kg BW/d.
- Ethambutol. → 20 – 25 mg/kg BW/d.
- Pyrazinamide. → 25 – 35 mg/kg BW/d.

all → oral except streptomycin → I.M.

3. Regimen :

- 6 – 9 months continuous of daily drugs.
- Initial phase :
 - 2 months.
 - 3 or 4 drugs of H + R + one or two as Z, S, E.
- Continuous phase :
 - 4 or 7 months of H + R.

*L - Internal Medicine - Chest.***4. N.B. : (T.B. & cortisone)****►► Uses of cortisone in T.B. :**

- 1) Very seriously ill patient.
- 2) T.B. of i serous membrane :
 - pericarditis.
 - peritonitis.
 - pleural effusion.
- 3) Tuberculous meningitis.
- 4) Genitor-urinary T.B. to prevent i development of ureteric stricture.
- 5) Suppression of L.N. enlargement during i chemotherapy.

►► Dose of prednisone : 40 mg/kg for 6 w.
 reduced gradually there after by 5mg/w.

5. Itt in special situation :**1. Renal failure :**

- a. Rifampicin is i safest.
- b. H , Z , R can be used é modification of i dose.
- c. S & E are contraindicated.

2. liver cell failure :

- a. S , H , E are safe. (هي)
- b. R , Z are contraindicated.

3. Pregnancy :

- a. H , E are good. (هو)
- b. No streptomycin.

Surgery in T.B.**▪ Limited to :**

- pleuropulmonary resection.
- pericardiotomy.
- intercostal tube → pneumothorax.
→ hydropneumothorax.

▪ Other previously used lines :

- thoracoplasty.
- phrenic nerve crush.
- pneumoperitoneum.
- artificial pneumothorax.

Prognosis of T.B. :

- proper management & good patient compliance to therapy
→ very good prognosis é high incidence of cure rate.

*L - Internal Medicine - Chest.***Bronchial asthma****Def. :**

It's a clinical syndrome of unknown cause characterized by :

- recurrent attacks of airway obstruction.
- diffuse.
- hyper-responsiveness of airflow.

Precipitating factors :

- 1- Genetic.
- 2- Allergy :
 - a. house dust.
 - b. pollens.
 - c. fungal.
 - d. animal.
 - e. insect.
- 3- Emotion.
- 4- Exercise.
- 5- Stress.
- 6- Infection : → viral before i age of 2 years.
- 7- Cold air & smoking.
- 8- Iatrogenic :
 - a. β -blockers.
 - b. aspirin.
 - c. A.C.E.I.s.

Types of asthma :

- 1- Extrinsic : identified environmental agent.
- 2- Intrinsic : no identified environmental agent.
- 3- Exercise induced : appear 5-10 min. after exercise.
- 4- Occupational : particular occupation.
- 5- Drug induced : β -blockers, aspirin & A.C.E.I.s.

Differentiating parameter	Extrinsic	Intrinsic
- Precipitating factors	Obvious	Not obvious
- Age of onset	Childhood	Middle age
- Family history	+ve	-ve
- Atopic tendency	Apparent	Absent
- Serum IgE level	Raised	Not raised
- Skin test to common allergen	+ve	-ve
- Asthma	Intermittent	Less labile & severe

Immunological features :

- Shedding of airway epithelium with exposure of nerve endings.
- Collagen deposition beneath the basement membrane (airway remodeling).
- Edema of bronchial mucosa with mast cell infiltration.
- Inflammatory infiltration, mainly neutrophils, eosinophils & lymphocytes.

Pathogenesis :

there are many mechanisms :

1- Immunological mechanism :

it is important in genesis of the disease in atopic patients :

a. immediate phase :

Ag & Ab (IgE) reaction on surface of mast cells

→ disruption of cells.

→ release of preformed mediators - histamine.
& - bradykinin.

→ broncho-constriction.

b. late phase :

other mediators as - platelet activating factor

(PAF). & - major basic proteins (MBP).

→ edema and cellular infiltration of bronchial wall.

c. macrophages, eosinophils & lymphocytes

→ inflammatory cascade in bronchial asthma.

2- Neural mechanism :

all components of ANS play a part in control of airways & their secretions :

- parasympathetic stimulation → broncho-constriction
& → ↑ mucosal secretions.

- sympathetic stimulation → broncho-dilatation.

- non-adrenergic non-cholinergic system (NANC)
→ inhibitory innervation to smooth ms.

N.B. : the neurotransmitter of NANC system is called vaso-active intestinal peptide (VIP).

3- Genetic factors :

- clinical observation → asthma runs in families.
- hereditary plays a part in genetic determination.

L - Internal Medicine - Chest.C/P :

1- Symptoms :

- a. Recurrent attacks of wheezes & dyspnea usually worsen by night.
- b. Cough is a frequent symptom may predominate → so maybe misdiagnosed as bronchitis.
- c. Attack → lasts from few minutes to few hours.

 Signs :

- a. between the attacks : absolutely normal.
- b. during attacks : (= emphysema)
 - i. inspection :
 1. shape → barrel shaped.
 2. movement → diminished
 - ii. palpation :
 1. trachea → central.
 2. TVF → ↓ed.
 - iii. percussion :
→ hyper-resonance
 - iv. auscultation :
 1. breath sound : vesicular & prolonged expiration.
 2. adventitious sounds :
 - a. wheezes & ronchi.
 - b. rub & crepitations.

Complication :

- 1- Respiratory failure may follow acute severe attacks.
- 2- Chronic severe asthma with steroid resistance.
- 3- Spontaneous pneumothorax.
- 4- Fracture of ribs.
- 5- Segmental collapse due to plugging with mucous.
- 6- Allergic broncho-pulmonary aspergillosis.
- 7- Psychological troubles.

*L - Internal Medicine – Chest.***Investigation :****1- Pulmonary function tests (corner stone in diagnosis of asthma) :**

- normal between the attacks.
- during the attacks ($\downarrow\downarrow$ FEV1 & FEV1/ FVC %).
- PEFR variability : diurnal variation in PE flow rate is $> 20\%$ with morning dipping.
- test of reversibility : $\uparrow$ in FEV1 $> 12\%$ or 200 ml after inhaling short acting β_2 agonists.
- non-specific broncho-provocation test : using methacholine & histamine (normal spirometry).
- blood gases : hypoxia & normo-capnea (severe cases) & if hyper-capnea $\rightarrow$ mechanical ventilation.

2- Radiology :

- a. normal chest X-ray in most cases
- b. not diagnostic .
- c. can detect : pneumonia, pneumo-thorax, collapse & fracture rib.

3- Detection of allergen :

- a. skin-prick tests.
- b. detection of total & specific IgE .
- c. detection of specific broncho-provocation test.

4- Blood picture :

- a. leukocytosis (infection).
- b. eosinophils (allergic cases).

5- Sputum analysis :

- a. eosinophils are detected in the sputum.
- b. Crushman's aspirals : they are :-
 - $\rightarrow$ yellow white wavy long threads.
 - $\rightarrow$ composed of shedded epithelium, esinophils, mucous in a fibrin network
- c. Creola bodies : they are clusters of columnar bronchial epithelium.
- d. Charcot-leyden crystals : they are crystalloid derivatives of esinophils.

6- ECG : to exclude cardiac causes of dyspnea.

Differential diagnosis :

- 1- COPD.
- 2- Left sided heart failure (cardiac asthma).
- 3- Pulmonary embolism.
- 4- Mechanical obstruction of airways by tumors or foreign bodies.
- 5- Drug induced cough, e.g. : ACEIs.
- 6- Vocal cord dysfunction.

Treatment :

- 1- Patient education in asthma management.
- 2- Assess and monitor asthma severity.
- 3- Avoid asthma triggers.
- 4- Establish individual medication plans for long-term management.
- 5- Establish individual medication plans for managing exacerbations.
- 6- Provide regular follow-up care.

N.B.:

- stage I: - intermittent. - < 2 attacks/w.
 - stage II: - mild persistent. - 3-4 / w.
 - stage III: - moderate persistent. - > 5 / w.
 - stage IV: - severe persistent. - frequent.

Stage	During the attack	In-between the attacks
I	• β_2 agonist (short-acting) • ventilation. • salbutamol.	No need.
II	As stage I.	• cortisone $\rightarrow$ mild dose. • long acting β_2 agonist; $\rightarrow$ salbutamol. • Na cromoglycate - inital. - Inhibit mediator release. • interleukin antagonist.
III	As stage II + • anti-cholinergic (ipratropium bromide).	As stage II + • Cortisone $\rightarrow$ moderate dose.
IV	As stage III.	As stage III + • Cortisone $\rightarrow$ high dose.

Acute severe asthma :

- Def. : It is an asthma had failed to resolve é therapy within 24 hours.
- C/P :
 - Symptoms : (a , b , c , d)
 - Anxiety.
 - Breathlessness.
 - Sweating.
 - Difficult speech.
 - Signs : [ا ح ا ج ا ت ٧ (3 C , 2 G , 2 -)]
 - Silent chest.
 - Cyanosis.
 - Disturbed level of consciousness.
 - General signs :
 - tachycardia (>120/min).
 - hypotension.
 - arrhythmia.
 - Blood gases : - ↓ O₂ - ↑ CO₂.
 - Pneumothorax.
 - Dehydration.
- Investigations :
 - peak flow meter < 60 liter / min.
 - arterial blood gas analysis :
 - ↓ PaO₂ é normal PaCO₂ (but ↑ é progression of disease).
- Treatment : (ا ح ا ج ا ت ٧)
 - 1- Admission.
 - 2- O₂ inhalation.
 - 3- Short-acting β₂ agonist → salbutamol.
 - 4- Aminophylline :
 - i. 6 mg/kg IV infusion over 20 min.
 - ii. 0.6 mg/kg/hr IV maintenance.
 - 5- Cortisone IV 4mg/kg. (may be repeated).
 - 6- Glucose 500 cc → 5%.
 - 7- Mechanical ventilation.
 - a. drowsy, coma.
 - b. resp. ms fatigue.
 - c. cyanosis, hypertension.
 - d. history of mechanical ventilation.

Near fatal asthma :

- Criteria for diagnosis :

- Patient who are drowsy or confused.
- Patient who are exhausted with respiratory muscle fatigue.
- There are paradoxical thoraco-abdominal movement.
- There are head sagging, central cyanosis & hypercapnea.
- There is bradycardia. → (necessitate mechanical ventilation).
- Previous history of mechanical ventilation.

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Chronic obstructive pulmonary disease C.O.P.D.

Def.: Airflow obstruction due to chronic bronchitis or emphysema.

- the obstruction : progressive & partially reversible.
- it may be accompanied by airway hyper-reactivity.

Chronic bronchitis:

Def.: It is a disease of bronchial tree ch' by productive cough, most days for 3 months per year in 2 successive years.

Ae.:

- Irritation → smoking. (↓ ciliary activity - inhibition of macrophage).
- air pollution.
- Infection. (exacerbating factor)

Predisposing factors:

- Genetic: (α₁ anti-trypsin deficiency.)
- Pulmonary congestion.
- Bronchiectasis.
- Sinusitis.
- Chest deformity.

Stages:

1-Simple bronchitis: (reversible)

- cough. كحة السجائر
- in early morning. الصبح
- whitish sputum. ناصع البياض

Why?

- Sleep → ++ parasympathetic → accumulation of secretion.
- Tolerance of receptor (smoking) → affect the cough reflex.
- So ►► when stop (during sleep) → regeneration of cough receptors → partial sensitivity.

2-Muco-purulent:

- mucoid then purulent. اصفرار البلغم الأبيض
- reversible. الناصع البياض ← كريمي

3-Obstructive: (irreversible)

- mucosa → hypertrophy. مرحلة الجد
- sub. Mucosa → accumulation of inflammatory cells.
- sm. ms. → hypertrophy.

*L - Internal Medicine - Chest.***Emphysema :**

Def.: enlargement of the air space distal to terminal bronchiole é destruction of alveolar wall. (↓ surface area.)

Ae:

- Chronic bronchitis. (99%)
- Bronchial asthma.
- Congenital (α1 anti-trypsin deficiency.)

N.B. : *Trypsin* → **destruct alveolar tissue (elastic fibers)**
 - α1 *antitrypsin* → **destruct the trypsin.**

PathoPhysiology:

Normal respiratory mechanism

- Ventilation.
- Perfusion.
- Diffusion.

إمداد الرئة بالهواء
 إمداد الرئة بالدماء
 تبادل الغازات بين الهواء والماء

- ▶▶ Chronic bronchitis → **hypoventilation.**
- ▶▶ Emphysema → **↓ diffusion (↓ surface area).**

❖ **Ch. Bronchitis :**

Hypoventilation :

- hypoxia (↓ PO₂). → cyanosis.
- hypercapnea (↑ PCO₂). → edema. (Pul.HTN. → RSHF)

2 b - blue. أزرق - bloater. منفوخ

N.B. : Respiratory center → no dyspnea.

Hypercapnea (mild → ++ R.C.) & (severe → -- R.C.)

❖ **Emphysema :**

Impaired diffusion :

- hypoxia (↓ PO₂).
- • normocapnea (normal PCO₂).

N.B. : why?? → diffusibility CO₂/O₂ = 24/1.

Hypoxia → ++ R.C.

2 p - pink. أزرق فاتح - puffer. ينفخ

C/P:A- Symptoms:

- 1- ♂ - old age - heavy smoker.
 - 2- Cough.
 - def. 3m X 2y.
 - stages. (3).
 - 3- Dyspnea → Emphysema.
 - 4- Pain → due to ch. Cough.
 - strain of the intercostal muscles.
 - pleurisy.
 - bullae rupture.
 - fracture rib.
 - 5- Wheezes → all the time.
- N.B.: bronchial asthma → attacks.

B- Signs:

1- General:

- puffy eye lid.
- clubbing.
- ascitis.
- position:
 - orthopnea.
- vital signs:
 - tachypnea.
- trachea:
 - ↓ length.
- muscles:
 - fossa indrawing.
 - abd. Protuberance.
- cong. Neck veins.
- edema lower limb.
- enlarged liver.
- epigastric pulsation
- professional attitude.
- pulsus paradoxus.
- tracheal tug.
- prominent muscles.

2- Local:

	Ch. bronchitis	Emphysema
<u>Inspection:</u>		
- shape	↓	barrel
- movement		↓
<u>Palpation:</u>		
- trachea	central	central
- T.V.F.	↓	↓
- palpable ronchi	+	-
<u>Percussion:</u>	normal	hyper resonance
<u>Auscultation:</u>		
- breath sound	- vesicular & prolonged expiration.	the same.
- adventitious sounds	- ronchi.	
	- rub.	
	- crepitations (fine).	

Complications Of C.O.P.D.

(١٠ باب)

a- Chest :

- 1- infection .
- 2- bronchiectasis.
- 3- bronchogenic carcinoma.
- 4- respiratory failure.
 - mentality disturbance.
 - astraxis.
 - terminal coma.

b- Cardiac :

- 5- R.S.H.F.
- 6- L.S.H.F.

c- Renal:

- 7- proteinurea. (renal congestion $\rightarrow$ R.S.H.F.)
- 8- salt and water retention. ($\uparrow$ CO₂ $\rightarrow$ stimulation of carbonic anhydrase enzyme inhibitor)

d- Stomach :

- 9- peptic ulcer.

Salt & water retention

e- Chronic cough (10-) :• thoracic :

- rupture bullae.
- haemothorax.
- stress fracture $\rightarrow$ rib .
- rupture $\rightarrow$ aneurysm .

• extra thoracic :

- $\uparrow$ I.A.P. $\rightarrow$ hernia and prolapse.
- $\uparrow$ I.O.P. $\rightarrow$ retinal hge.
- $\uparrow$ I.C.P. $\rightarrow$ mycotic aneurysmal rupture.

• general :

- insomnia.
- exhaustion.

- partly cured

Investigation:1- Rad. :1- X-ray:

- emphysema:
 - hypertranslucency. jet black
 - transverse ribs.
 - heart $\rightarrow$ ribbon shaped.
 - diaphragm $\rightarrow$ depressed.

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- ch. Bronchitis : ↑ brocho-pulmonary markings.
- feature of the cause : - chest deformity.
- feature of the complication : - pneumothorax.
- pneumonia.

ii- C.I. : diagnose early cases.

2- Arterial bl. Gases:

	Emphysema	Ch. Bronchitis
PaO ₂ (normal 100mmhg)	↓	↓
PaCO ₂ (normal 40mmhg)	↑ (normal)	↑

3- Pul. Function tests:a- ventilation:

- 1- tidal volume : (normal = 500 c.c.)
- volume of air inspired or expired during rest.
- 2- vital capacity : (normal = 5000 c.c.)
- volume of air expired by forced expiration after max. inspiration.
- 3- forced exp. Volume 1 (FEV₁):
- vital capacity in 1st sec.
- normal = 80% - C.O.P.D. = 50-60%.
- 4- forced exp. Time :
- time to do forced exp. After max. insp.
- normal < 5 sec. - C.O.P.D. > 5 sec.
- 5- residual volume :
- volume remaining in i lung after forced exp. Following max. insp.
- normal = 1500 c.c. - C.O.P.D. (↑ed).
- 6- total lung capacity :
- vital capacity + residual volume.
- normal = 6500 c.c. - C.O.P.D. (↑ed).

b- perfusion:

- lung scan.

c- diffusion:

- CO → transfer factor.
- volume insp. - volume exp. = diffusion.

4- Serum α1 antitrypsin level :

- less than 45yrs é emphysema.
- strong family history.

5- E.C.G. :

- P-pulmonale
- atrial & ventricular arrhythmias.

6- Echo.

- assess cardiac contractility & pul. Artery pressure.

Differentiation () blue bloater & pink puffer.

	Blue bloater	Pink puffer
C/P		
- built: - dyspnea: - edema: - sputum: - complication:	obese. mild. edematous. large volume. CHF(gallop & ↑s2)	thin & elderly. marked. rare. small volume.
Inv.		
- bl. gases : - airway obstruction : - total lung capacity: - rad.(evidence of emphysema) : - transfer factor : - polycythemia :	↓Pao ₂ & ↑PaCO ₂ . moderate. normal. absent. no reduction. +	near normal. very severe. ↑ed. present. impaired. -

Differential diagnosis of C.O.P.D. :-**a- Asthma :-**

- family history.
- symptoms at night or early morning.
- reversible airway obstruction.
- associated é allergy, rhinitis &/or eczema.

b- Congestive heart failure :-

- bilateral basal crepitation.
- X-ray → dilated heart & pul. Edema.
- PFT → volume restriction.
- no airflow limitation.

c- Bronchiectasis :-

- purulent sputum é clubbing.
- coarse crepitation.
- X-ray & C.T. → bronchial dilatation.

d- T.B. :-

- X-ray → lung infiltration or nodular lesion.
- high local prevalence.

Clinical data	C.O.P.D.	Asthma
History:		
smoking history	+	-
cough	progressive.	intermittent.
C/P :		
cough	early morning.	night.
sputum	purulent.	not purulent

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dyspnea central cyanosis wheeze peripheral edema	all the time. may be present. continuous. occasional.	in attacks. absent. in attacks. not a feature.
Inv. : FEV1 (↓) test of reversibility response to broncho dilator response to corticosteroids	always. partial. partial. partial.	during exacerbations marked. good. good.

Management of C.O.P.D. :

→ bronchi ~~emp~~ → 4
→ H.F
→ Respiratory failure → 4

1- TTT of i cause :

- removal of the irritation → stop smoking.
- removal of the infection → amoxicillin + erythromycin.
→ culture & sensitivity.

2- TTT of the manifestation :

- bronchodilator.
- Corticosteroids. ? → controversial

3- TTT of the complication.

4- TTT of acute exacerbations :

- antibiotic.
- bronchodilators.
- steroids.
- O2 therapy.
- mechanical ventilation.

5- long term O2 therapy.

- > 15 h / day.

6- Indication of ICU & mechanical ventilation :

- severe dyspnea not respond to ttt.
- confusion , lethargy & coma.
- Pa O2 50 mmhg.
- PACO2 > 70 mmhg.
- severe acidosis < PH.

7- Surgical ttt:

- lung reduction surgery.
- lung transplantation.

Lung cancer

Def. : Cancer that arise in airways or pulmonary parenchyma.

Ae. : Unknown.

Risk factors :

- 1- Cigarette smoking :
 - ↑ risk 10-15 times.
 - Passive smokers → 2 times increase.
- 2- Air pollution :
 - Motor vechils.
 - Coal burning.
- 3- Occupational factors :
 - Asbestos.
 - Radon.
- 4- Lung lesions :
 - old fibrosis.
 - C.O.P.D.
- 5- Genetic factors.
- 6- Diet :
 - low β-carotene & vit.A.

Pathology of lung cancer :

Classification	Site	Incidence %
▪ Squamous cell carcinoma	Central	35%
▪ Small cell carcinoma	Central	20%
▪ Adeno carcinoma	Peripheral	30%
▪ Large cell carcinoma	Peripheral	10%
▪ Others : carcinoid, lymphoma	Central or Peripheral	5%

Spread :

- 1- Local spread :
 - a. to i pleura → peripheral type.
 - b. to i mediastinum → central type.
- 2- Blood spread :
 - bone.
 - liver.
 - brain.
 - Kidney.
- 3- Lymphatic spread:
 - hilar,
 - mediastinal,
 - axillary or - cervical L.N.

C/P: (Intrathoracic , extrathoracic)

1- Intrathoracic (local) :

a. Bronchial manifestations :

(٧ حاجات)

i. Asymptomatic

→ 25%

ii. Cough & haemoptysis :

1. change in character of cough.
2. blood tinged sputum.
3. red current gelly sputum.

iii. Dyspnea & pain.

iv. Pnumonia :

1. unresolved.
2. recurrent in i same side.

v. Bronchial obstruction :

1. partial :

- a. emphysema. (alveoli)
- b. bronchiectasis. (bronchi)

2. complete :

- lung collapse.

vi. Lung abscess.

vii. Pancoast tumor :

1. peripheral.
2. apical*.
3. thoracic inlet syndrome*.

➤ **Thoracic inlet syndrome* : (2 n., 2 bl.v., 2 b.)**

- Brachial plexus :
 - pain & hypoesthesia.
 - weakness & atrophy of i small ms. of i hand.
- Sympathetic chain :
 - ptosis. ▪ enophthalmous.
 - myosis. ▪ uni lateral nasal congestion.
 - anhyrosis. ▪ loss of i serno-spinal reflex.
- Subclavian artery :
 - unequal pulse.
 - ischemia.
- S.V.C.
 - congested neck veins. (non pulsing.)
- 1st rib :
 - erosion.
- 2nd rib :
 - ersion.

*L - Internal Medicine - Chest.***➤ D.D. of apical lung lesion* :**

- pancost tumor.
- T.B.
- klebsiella pneumonia.
- bronchiectasis cica haemorrhagica.

b. Pleural manifestations :**i. Pleurisy.****ii. Pleural effusion.**

1. chylus → thoracic duct.
2. haemorrhagic → artery.
3. exudate.
4. empyem.

c. Mediastinal manifestations :**i. Dyspnea :**

→ trachea.

ii. Dysphagia :

→ esophagus.

iii. Hoarseness of voice : → recurrent laryngeal nerve.**2- Extrathoracic :****a. Metastasis :****i. Liver :**

1. jaundice.
2. palpable tender liver

ii. Bone :

1. pain.
2. pathological fracture

iii. C.N.S. :

1. paralysis.
2. polyneuropathy.
3. myopathy.
4. ↑ intra-cranial tension.

iv. C.V.S. :

- pericardial effusion.

b. Para-malignant syndrome :**i. Cachexia.****ii. Clubbing.****iii. Endocrine abnormalities :**

1. Cushing syndrome.
2. hyperglycemia.

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3. SIADH.
4. hyperparathyroidism.
5. thyrotoxicosis.

iv. Neurological abnormalities :

1. polyneuropathy.
2. myasthenia. (efon-lurnbart syndrome)
3. myopathy.
4. autonomic neuropathy.

v. Hematological :

1. thromboembolic manifestation.
2. anemia.
3. leukomoid reacyion.

vi. Cutaneous :

1. acanthosis negricans.
2. dermatomyositis.

Investigation :

1- Sputum ctology : for any malignant cells.

2- Chest X-ray :

- a. coin shadow.
- b. mediastinal mass.
- c. pleural ffusion.
- d. elevated diaphragm.

3- C.T. & M.R.I. :

- a. localization. (of i L.N. • hilar &
- b. evaluation. • Mediastinal.)

4- Fiberoptic broncoscopy :

- a. morphology of i tumor → endobronchial.
- b. widening of i carina.
- c. biopsy (brushing & washing) → tissue dignosis.

5- Transloracic needle aspiration :

- biopsy → peripheral lung lesion.

6- Mediastinoscopy :

- evaluation of i mediastinal L.N.

7- Pleural fluid cytology & pleural biopsy.

8- Lab. :

- a. H.B. % & E.S.R.
- b. liver function.
- c. serum Ca & Alk. phosphatase.

9- Metastatic assessment :

- a. abd. U/S .
- b. brain C.T.
- c. bone survey & scan.

Staging : (T.N.M. staging)

- Tx** cannot be assesed.
T0 no evidence.
T1 < 3cm & not involving i main bronchus.
T2 > 3cm & involving i main bronchus.
T3 chest wall invasion. Or within 2 cm from i carina.
T4 mediastinum. Great vessels. Trachea.
- Nx** cannot be assesed
N0 no evidence.
N1 ipsilateral hilar L.N.
N2 ipsilateral mediastinal L.N.
- Mx** cannot be assesed.
M0 no evidence.
M1 metastasis.

Treatment :

- 1- Surgical :
a. operable.
b. inoperable.
- 2- Radiotherapy.
- 3- Chemotherapy :
a. cyclophosphide.
b. adriamycin.
c. methotrexate.
- 4- Laser.
- 5- Combination.
- 6- Palliative :
a. stop smokng.
b. health education.
c. symptomatic relief :
i. pain.
ii. mediastinal syndrome.
iii. paramalignant syndrome.

Collections of chest

Chest causes of jaundice :

1. Hepatocellular :
 - a. cor-pulmonale.
 - b. rifampicin (anti T.B.)
 - c. associated viral hepatitis.
2. Hemolytic :
 - pulmonary embolism.
3. Obstructive :
 - bronchial carcinoma(liver metastases).

Chest causes of cyanosis :

1. Peripheral :
 - a. Rt. Sided HF (B. cor-pulmonale).
 - b. S.V.C. thrombosis.
2. Central :
 - a. C.O.P.D.
 - b. pulmonary fibrosis.
 - c. pulmonary embolism.
3. Both :
 - Massive pulmonary embolism.

Chest causes of LL edema :

1. R.V.F. : due to cor-pulmonale.
2. Hypoalbuminemia :
 - a. lost purulent sputum in SLS.
 - b. frequent aspiration of empyema.
 - c. nutritional : anorexia (↓ protein intake).
3. Nephritic syndrome :
 - renal amyloidosis in long standing SLS.
4. Renal regulation in C.O.P.D. :
 - ↑ PaCO₂ leads to compensatory ↑ NaHCO₃ reabsorption from kidney, Na & H₂O retention.

Main causes of chronic cough :

1. Chronic bronchitis.
2. Suppurative lung syndrome (SLS).
3. T.B.

Chest causes of clubbing :

1. Bronchiectasis,
2. Pulmonary fibrosis,
3. T.B.
4. COPD.
5. Cystic fibrosis.
6. Lung cancer.

Chest causes of acute dyspnea :

1. Asthma.
2. Pulmonary edema.
3. Pneumothorax.
4. Pulmonary embolism.
5. Pneumonia.
6. Pleural effusion.

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L - Internal Medicine - Chest

Chest Disease	Inspection		Palpation		Percussion	Auscultation		
	Shape	Move-ment	Trachea (Medastinum)	TVF		Breath sounds	Adventitious sounds	Special tests
1- Consolidation	normal	↓	central	+	dull	bronchial	crepitations	
2- Cavitation	normal	↓	central	+	dull	bronchial	crepitations	post-tussive sputum
3- Emphysema (+ Chronic Bronchitis)	barrel	↓	central	-	hyper-resonance encroaching on normal cardiac & hepatic dullness	- vesicular with prolonged respiration - late ↓	rhonchi	
4- Collapse	retraction	↓	shift to same side	-	dull	- decreased - ± bronchial	rhonchi & crepitations	
5- Fibrosis	retraction	↓	shift to same side	-	dull	- decreased - ± bronchial	rhonchi & crepitations	
6- Pleurisy	normal	↓	central	normal	normal	↓	rub	
7- Pleural effusion	bulge	↓	shift to opposite side	-	stony dullness rising to axilla	↓		
8- Pneumo-thorax	bulge	↓	shift to opposite side	-	tympanic resonance	↓		+ve coin test.
9- Hydropneumo-thorax	bulge	↓	shift to opposite side	-	stony dullness & horizontal upper limit & tympanic resonance above it + shifting dullness	↓		succession splash.

Heamoptysis

Def. : Expectoration of blood originating from lower respiratory tract (trachea, bronchi & lung parenchyma).

Ae :

1. Lung disorder : (common causes 4b & 4P)

- a. bronchitis.
- b. bronchiectasis.
- c. bronchial adenoma.
- d. bronchogenic carcinoma.
- e. pulmonary infarction.
- f. pulmonary T.B.
- g. pulmonary embolism.
- h. pneumonia.

2. CVS causes :

- a. pulmonary congestion :
- b. aortic aneurysm.
- c. malignant HTN.
- d. post. myocardial infarction syndrome.

3. Systemic diseases :

- hemorrhagic blood diseases ;
- e.g. :
 - purpura.
 - Leukemia.

4. Cryptogenic (idiopathic) hemoptysis.

N.B. : Common causes of massive hemoptysis :

- 1- T.B.
- 2- Bronchiectasis.
- 3- Fungal infection.
- 4- M.S.
- 5- Bronchogenic carcinoma.

Difference () Hemoptysis & Hematemesis.

	Hemoptysis	Hematemesis
Before attack	- Chest. - cardiac trouble.	- GIT (pain, nausea, vomiting)
During attack	- Coughing of blood. - Bright red blood. - Mixed é air (frothy). - Alkaline.	- Vomiting of blood. - Coffee-ground. - Mixed é food. - Acidic.
After attack	- Blood tinged sputum for a while.	- Melena. - Constipation.
Exam.	- Chest. - CVS signs.	- GIT signs.

Great thanks to

Dr./ Ahmed mowafy.

✦ For any :

- Advice.
- Suggestion.
- Request. &/or
- Questions.

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Pulmonology revision

Enumerate :

- 1. Causes of pleural effusion.**
- 2. Causes of pneumothorax.**
- 3. Causes of pneumonia.**
- 4. Causes of bronchiectasis.**
- 5. Causes of acute respiratory failure.**
- 6. Causes of chronic respiratory failure.**
- 7. Causes of interstitial lung diseases (ILD)**
- 8. Causes of hemoptysis.**
- 9. Causes of massive hemoptysis.**
- 10. Causes acute chest pain.**
- 11. Causes of clubbing due to chest diseases.**
- 12. Causes of central cyanosis.**
- 13. Causes of dry cough.**
- 14. Causes of hypoxia.**
- 15. Causes of acute respiratory distress syndrome.**
- 16. Causes of solitary pulmonary nodule.**
- 17. Causes of reticular shadows on plain X-ray chest.**
 - a) Acute pulmonary edema (cardiac, non cardiac)
 - b) Atypical pneumonia e.g. Mycoplasma.
 - c) ILD : Sarcoidosis, silicosis, asbestosis, idiopathic pulmonary fibrosis.
 - d) Neoplasia : lymphangitis carcinomatosis.
 - e) Wegener's, SLE.

18. Causes of nodular shadows on plain X-ray chest.

- a) Neoplasia : metastasis, lung cancer, adenoma.
- b) Infections : varicella pneumonia, septic emboli.
- c) Granulomas : miliary TB, Sarcoidosis, Wegener's .
- d) Pneumoconiosis (except asbestosis), Caplan's syndrome.

19. Causes of coin shadow.

- a) Bronchogenic carcinoma, solitary metastasis.
- b) TB, FB.
- c) Pneumonic stage of lung abscess.
- d) Granuloma.
- e) Encysted effusion.
- f) Calcified cyst.

20. Causes of mediastinal syndrome.**21. Causes of cor-pulmonale.****22. Causes of effusion with low sugar content.****23. Causes of hepatomegaly in respiratory diseases.**

- a) Chronic venous congestion in cor-pulmonale e.g. COPD
- b) Metastatic liver in lung cancer.
- c) Ptosed liver in emphysema.

24. Extra-pulmonary manifestations of bronchogenic carcinoma.**25. Complications of pneumonia.****26. Complications of bronchiectasis.****27. Various types of pneumothorax.****28. Types of sputum.**

29. Types of crepitations.**30. Causes of chronic cough with normal chest X-ray.**

- Cough variant asthma or eosinophilic bronchitis.
- Smoking.
- ACEIs.
- GERD.
- Postnasal drip : due to allergic rhinitis or chronic sinusitis.

31. Causes of cough.**32. Non respiratory causes of cough.**

- a) GERD.
- b) Drug induced : ACEIs.
- c) Central causes : brain tumor, cerebral strokes, encephalitis.
- d) Reflexes : due to irritation of vagal branches :
 - Meningeal branches : meningitis.
 - Auricular branches : otitis media.
 - Cardiac branches : arrhythmias.
 - Gastric branches : distension of gallbladder.

33. Causes of wheezy chest. P146 (generalized & localized)**34. Indications of bronchoscopy. P 148****35. Indications of lung transplantation. P148**

GIVE A SHORT ACCOUNT ON :

1. Diagnosis, treatment of pleural effusion.
2. Types of pleural effusion. P 15
3. Diagnosis of pneumonia.
4. Complications of pneumonia.
5. Treatment of pneumonia.
6. Non-resolving pneumonia.
7. Management of bronchiectasis.
8. Diagnosis of chronic lung abscess.
9. Diagnosis of bronchogenic carcinoma.
10. Etiology of COPD & define chronic bronchitis.
11. Clinical picture, investigations of COPD.
12. Treatment of COPD.
13. DD of COPD. P 51
14. Emphysema (Etiology, diagnosis, complications, treatment)
15. Acute severe asthma (status asthmaticus)
16. Diagnosis of bronchial asthma.
17. Treatment of bronchial asthma.
18. Diagnosis of acute & chronic respiratory failure.
19. Anti-tuberculous drugs.
20. C/P & investigations of TB.
21. Hemoptysis.
22. Diagnosis of acute chest pain of pulmonary origin.

23. Mediastinal syndrome.

24. The dark side of oxygen. P 129

25. Occupational interstitial lung diseases (Pneumoconiosis)

26. C/P & investigations of sarcoidosis.

27. Surface anatomy of the pleura & lung. P 7, 8

28. Extra-pulmonary manifestations of bronchogenic carcinoma.

29. Extra-pulmonary manifestations of sarcoidosis.

30. Diagnosis of pneumothorax.

31. The value of eye examination of sputum sample.

a) Clear & colorless : chronic bronchitis.

b) Yellow/green : pulmonary infection.

c) Red : hemoptysis (.....)

d) grey : smoking, coal.

e) Pink frothy : pulmonary edema.

32. Drug induced lung disease. (written, oral, MCQ)

Respiratory condition	Drug
Bronchospasm	☒ B blockers. ☒ NSAIDs
Cough	☒ ACEIs
Respiratory center depression	☒ Sedatives, Opiates.
ARDS	☒ Prolonged inhalation of oxygen. ☒ Opiates, Cocaine, Heroin.
Pulmonary thromboembolism	☒ Estrogen
Pleural effusion	☒ Amiodarone ☒ Methotrexate ☒ Phenytoin ☒ INH ☒ Hydralazine
Interstitial pulmonary fibrosis	☒ Amiodarone. ☒ Methotrexate. ☒ Nitrofurantoin (antibiotic)

GIVE REASONS : (written & oral)**1. Congested neck vein in COPD.**

- a) Increased intra-thoracic pressure.
- b) Hypoxic Cor-pulmonale.

2. Edema LL in COPD.

- a) Salt & water retention induced by hypoxia of the kidney.
- b) Hypoxic Cor-pulmonale.

3. Puffy eyelids in COPD.

- a) Straining caused by chronic cough.
- b) Hypoxic cor-pulmonale.
- c) Proteinuria.

4. Pulmonary hypertension in COPD.

- a) Hypoxia causes reflex pulmonary arteriolar VC.
- b) Hypoxia causes polycythemia → ↑ pulmonary resistance.
- c) Hypoxia causes peripheral VD → ↑ VR to RV
- d) Compression of the capillaries by the distended alveoli
(hyperinflation)
- e) Reduction of the number of capillaries due to destruction of alveoli.
- f) Fibrosis of blood vessels.

5. RSHF in patients with COPD.

- a) Causes of pulmonary hypertension (see above)
- b) In severe cases, hypercapnia results in respiratory acidosis → myocarditis.

6. Chest pain in COPD.

- a) Muscular pain : due to chronic cough.
- b) Pleurisy complicated pneumonia.
- c) Pneumothorax : due to rupture emphysematous bullae.

7. Irreversible bronchial obstruction in chronic bronchitis.

- a) Mucous gland hypertrophy.
- b) Infiltration of the walls of bronchi with inflammatory cells
(neutrophils, CD8 + T lymphocytes).
- c) Inflammation is followed by scarring & remodeling process that thickens the walls of bronchi.

8. Palpable liver in COPD.

- a) Ptosed liver due to emphysema : not tender.
- b) Congested liver due to RSHF : tender.

9. Elevated hemoglobin with COPD.

Chronic hypoxia → ↑ of BM → secondary polycythemia.

10. Increased serum bicarbonate in COPD.

Retention of sodium bicarbonate by the kidneys as a compensatory mechanism to correct respiratory acidosis.

11. Silent chest in acute severe asthma.

- a) Exhausted respiratory muscles.
- b) Small amount of air passing through the bronchi.

12. Neurological manifestations in bronchial carcinoma.

- a) Brain metastasis : hemiplegia
- b) Mediastinal syndrome : caused by tumor or LN (....)
- c) Thoracic inlet syndrome in pancoast tumor : (....)
- d) Para-malignant syndrome : esp in small cell carcinoma (....)

13. Dyspnea in lung cancer

- Pneumonia.
- Underlying chronic lung disease e.g. COPD.
- Lobar collapse.
- Pleural effusion.
- SVCO.
- Upper airway obstruction.
- Pulmonary emboli.
- Lymphangitis carcinomatosa.
- Pericardial effusion.
- Anxiety and panic.

14. Unequal pupil in bronchial carcinoma.

Compression of subclavian artery : in mediastinal or thoracic inlet syndromes.

15. Chest pain in lung cancer.

- a. Invasion of the mediastinum, pleura and chest wall.
- b. Pancoast tumor : intractable neck, chest & arm pain due to compression and invasion of brachial plexus.
- c. Involvement of the esophagus : pain on swallowing.

16. Cushing's syndrome in bronchogenic carcinoma.

Endocrinal manifestation of para-malignant syndrome : secretion of ACTH by tumor cells esp in small cell carcinoma → ↑ ↑ zona fasciculata of cortex of supra-renal gland to secrete cortisol.

17. Carcinoid syndrome.

- The syndrome includes flushing and diarrhea, and, less frequently, heart failure and bronchoconstriction.
- The carcinoid syndrome occurs in approximately 10% of carcinoid tumors (neuroendocrine tumors, usually appear in the GIT e.g. appendix, small intestine, colon, rectum, and in the lungs)
- It is caused by endogenous secretion of mainly serotonin and kallikrein.
- In most patients, there is an increased urinary excretion of 5-HIAA (5-hydroxy indole acetic acid), a degradation product of serotonin.
- Treatment :
 - Surgical resection of tumor and chemotherapy (doxorubicin)
 - Octreotide (a somatostatin analogue that neutralizes serotonin and decreases urinary 5-HIAA)
 - Methysergide (antiserotonin agent but not used because of serious side effect of retroperitoneal fibrosis)

18. Cardiac abnormalities in carcinoid syndrome

- ➡ About 50% of patients have cardiac abnormalities, caused by serotonin-induced fibrosis of the tricuspid and pulmonary valves.
- ➡ Elevated levels of serotonin have been associated with cardiac failure, due to fibrous deposits on the endocardium.

19. Dyspnea after operation (Post operative pulmonary complications)

- ✓ Aspiration pneumonia.
- ✓ Aspiration lung abscess.
- ✓ ARDS.
- ✓ Pulmonary embolism.
- ✓ Postoperative collapse.
- ✓ Pneumothorax.

20. Rusty sputum

Present in lobar pneumonia due to color of hemoglobin of hemolysed RBCs in stage of red hepatization.

21. Chest pain in pneumonia.

- a) Pleurisy.
- b) Muscular pain due to repeated cough.

22. Non- resolved pneumonia. (Pneumonia lasting for > 2 weeks inspite of treatment)

- Inadequate treatment.
- Atypical organism.
- Immunocompromised patient.
- Underlying lung disease e.g. lung cancer.
- Pneumonia complicated by empyema or lung abscess.

23. Jaundice in TB.

a) Hepatocellular jaundice :

- Hepatotoxicity : Anti-TB drugs e.g. Rifampicin
- Extrapulmonary affection of the liver.

b) Obstructive jaundice : spread to LN in porta hepatis.

24. Jaundice in bronchogenic carcinoma.

a) Hepatocellular jaundice :

- Hepatotoxicity : side effects of chemotherapy.
- Extrapulmonary affection of the liver.

b) Obstructive jaundice : spread to LN in porta hepatis.

c) Hemolytic jaundice : para- malignant syndrome.

25. Jaundice in pneumonia

a) Hemolytic jaundice : hemolysis of RBCs present in consolidated area.

b) Hepatocellular : Impaired liver function by toxemia.

26. Abscess in right lower lobe of the lung

This is usually primary (inhalation) lung abscess. The inhaled material usually goes to the right lower lobe as the right lower bronchus is wide & in direct continuity with the trachea.

27. Edema LL in bronchiectasis.

a) Excessive sputum → loss of protein.

b) Cor-pulmonale.

c) Renal amyloidosis.

28. Hemorrhagic effusion. P 16

29. Exudative pleural effusion. P 11

30. Clubbing in respiratory diseases.

a) Pale clubbing (due to toxemia) :

- Suppurative lung diseases e.g. bronchiectasis.
- Bronchogenic carcinoma.
- TB.

b) Blue clubbing (due to hypoxia) :

- Interstitial lung diseases.
- Arterio-venous shunts.
- COPD (rare)

31. False -ve tuberculin test.

- Cortisone therapy or Immunocompromised patients.
- Improper technique.
- Pre immune phase (it takes 2–10 weeks after tuberculosis infection for an immune response to PPD to develop)
- fulminant tuberculosis especially military TB.

32. Anemia in TB

- Anemia of chronic disease.
- Toxic inhibition of BM (BM failure)
- Malnutrition.
- Chronic hemoptysis.

Cases

1- A 35-year-old patient complains of chronic cough & expectoration of excessive purulent sputum averaging 320 ml/d. The condition partly improves with antibiotics to recur again. Expectoration increases on awakening in the morning and on leaning forward. The patient also has 3rd degree clubbing.

- a) What is the most probable diagnosis ?
- b) Mention other conditions that can give a similar clinical picture ?
- c) What is the etiology and pathogenesis of the patient's illness ?
- d) How to treat such patient ?

a) What is the most probable diagnosis ?

Bronchiectasis.

b) Mention other conditions that can give a similar clinical picture ?

- 1) Lung abscess.
- 2) Infected cystic lung.
- 3) Empyema with bronchopleural fistula.

2- A patient presenting with dyspnea 3 days following an attack of fever 39°C with cough & expectoration. Physical examination revealed decreased movement on the right side of the chest with decreased fremitus, dullness to percussion, and decreased breath sounds all on the right. The trachea is deviated to the left.

a) What is the most likely diagnosis ? Right pleural effusion.

b) What are the causes of this condition ?

c) How to proceed in the management of this case ?

3- A 62 years old woman with congestive heart failure develops pneumonia and a large pleural effusion. Thoracocentesis is performed in an effort to establish whether the pleural effusion is due to heart failure or pneumonia. The aspirate showed a protein content of 6 g%, a glucose content of 30 mg% and an LDH content of 400 mg%.

a) Can u now answer the question whether the pleural effusion is due to CHF or pneumonia ? And how did u know ?

b) What other tests can be performed on the pleural aspirate to reach a specific diagnosis ?

c) What are the types of pleural effusion?

d) How to manage the case ?

a) Pleural aspirate should be analyzed to know whether it is a transudate or exudate (.....) : Pneumonia : exudate, CHF : transudate

4- A heavy smoker man 74 year old, presented with hemoptysis. On examination he was cachectic and had 2 hard LN 2 cm in size, in the right supraclavicular area. There was dullness in the upper right anterior part of the chest. He had a history of right upper limb pains and atrophy of the hypothenar muscles was noted.

- a) What is the diagnosis ?
- b) Enumerate causes of atrophy of the small muscles of the hand.
- c) Enumerate 5 hazards related to smoking.
- d) How would you treat him ?

5- A 45 year heavy smoker man presented to the outpatient clinic with an acute respiratory infection of few days duration. On examination his chest was over inflated and bilateral basal medium sized crepitations were detected.

- a) What is the probable diagnosis ?
- b) What are the investigations you would ask for ?
- c) How would you treat him ?

6- A 32-year old man suffers since adolescence from recurrent attacks of dyspnea and chest wheezing. He doesn't smoke. His symptoms are controlled with an inhaled drug.

- a) What do you expect his pulmonary function to show during an attack?
- b) What is the pathogenesis of this condition ?
- c) What is the medical treatment of this condition ?

a) What do you expect his pulmonary function to show during an attack?

- FVC is reduced.
- FEV1/FVC is reduced.
- Bronchodilator test : improvement of FEV1 > 15%
- Peak Expiratory Flow rate : is decreased.

7- A 63 year- old man with a 40 pack-year smoking history complains of progressive dyspnea, persistent cough and weight loss. He also has 3rd degree clubbing. Chest examination revealed decreased movement on the right side of the chest with decreased fremitus, dullness to percussion, and decreased breath sounds all on right. The trachea is also deviated to the right side. A right scalene LN 3 cm in diameter was readily palpable.

- a) What is the most probable diagnosis ? and why ?
- b) How to investigate this case to reach specific diagnosis ?

The patient's investigations showed in addition metabolic alkalosis, elevated serum cortisol and ACTH.

- c) What do you expect as a complication of this condition ?
- d) What is the pathological type of this type of lesion in the lung ?
- e) What other related complications that may be present in such a case ?

a) What is the most probable diagnosis ? and why ?

- Bronchogenic carcinoma in the right lung presenting with right pleural effusion.
- The effusion is **malignant due to shift of the trachea to the same side** due to collapse of the underlying lung due to bronchial obstruction by the tumor.
- Other indications for presence of bronchogenic carcinoma are the old age, smoking history, weight loss, 3rd degree clubbing,& presence of scalene LN enlargement.

C) What do you expect as a complication of this condition ?

Cushing syndrome due to ectopic secretion of ACTH by the tumor.

d) What is the pathological type of this type of lesion in the lung ?

Small cell lung cancer.

8- A 27 year old female presented with fever , anorexia, dyspnea, dull aching chest pain on the right side, together with dry cough. She had been losing weight for the last 4 months. On examination there was pallor, low grade fever and a toxic face. The apex beat was in the 5th space outside the MCL. There was stony dullness in the right lower & middle lung zones, with decreased breath sounds in the same zones.

a)What is the most probable diagnosis ?

b) What are the 3 most important investigations you would request ?

c)Just outline the main lines of treatment ?

a) Right side pleural effusion probably due to TB

b)

1) Chest radiology : X ray & CT (most accurate, may identify as little as 10 mL of fluid)

2) Pleural aspiration : exudate (....) with the features of TB :

- Rich in lymphocytes & RBCs , Low glucose level.
- Bacteriological examination : ZN

3) pleural biopsy is diagnostic & show tuberculous granuloma in 2/3 of patients.

c)

1. General : Rest, good nutrition.
2. Anti TB drugs : (see book)
3. Chemotherapy alone is inadequate due to poor penetration of anti-TB drugs, so must be drained by ICT & surgical removal of a calcified empyema is necessary.
4. Cortisone : to reduce inflammation & fibrosis.

9- A 65 year-old male, heavy smoker since 40 years used to suffer from persistent cough during the last 7 years & was diagnosed as chronic bronchitis. Recently, he started to lose weight since few months & he noticed change in character of cough since few weeks, cough became more severe & prolonged. He had 3 attacks of hemoptysis.

On examination : Temp : 38°C, Clubbing & pallor.

- a) What is the most probable diagnosis ?**
- b) Mention the 2 most important investigations in this patient .**
- c) How can u explain clubbing, pallor & fever ?**

a) Bronchogenic carcinoma.

b)

1- Radiology (X-ray, CT)

2- Bronchoscopy & biopsy.

c)

- Clubbing : para-malignant syndrome (unexplained)
- Pallor : anemia (Anemia of chronic disease, para-malignant S)
- Fever : pneumonia, lung abscess, bronchiectasis, empyema, para-malignant S

MCQ

- 1- A low protein content is characteristic of pleural effusions associated with :
 - a) TB.
 - b) Cirrhosis.
 - c) Bronchogenic carcinoma.
 - d) Rheumatoid diseases.
- 2- Which of the following manifestations is typical of Kartagener's syndrome?
 - a. Intestinal obstruction
 - b. Dextrocardia
 - c. Steatorrhea
 - d. Infertility
- 3- Hypercapnia is a typical feature of :
 - a) Pulmonary embolism.
 - b) Salicylate intoxication.
 - c) Pulmonary fibrosis.
 - d) Severe chronic bronchitis
- 4- In pneumonia, the following features are classically associated with the specific organisms EXCEPT :
 - a) Erythema nodosum and Mycoplasma pneumonia.
 - b) Hyponatremia and Legionella pneumonia.
 - c) Abscess formation and Staphylococcus aureus.
 - d) Hemolytic anemia and Streptococcus pneumonia.
- 5- In lobar pneumonia which of the following is true in arterial blood :
 - a) Decreased Po₂, increased PCO₂
 - b) Decreased Po₂ , Decreased Pco₂.
 - c) Decreased Po₂ and normal Pco₂.
 - d) Normal Po₂, increased Pco₂.
- 6- Which is NOT a part of Kartagener syndrome :
 - a) Dextrocardia.
 - b) Sinusitis.
 - c) Impotence.
 - d) Bronchiectasis.
- 7- Which is correct in type 2 respiratory failure :
 - a) Decreased Po₂, increased PCO₂
 - b) Decreased Po₂ , Decreased Pco₂.
 - c) Decreased Po₂ and normal Pco₂.
 - d) Normal Po₂, increased Pco₂.

- 8- In pleural effusion, an impaired transport of glucose into the pleural space is found in :
- TB
 - Myxedema.
 - Liver cirrhosis.
 - Rheumatoid arthritis.
- 9- Bronchial breath sound is found in all EXCEPT
- Collapse with patent bronchus.
 - bronchial asthma.
 - superficial, big, cavity with patent bronchus.
 - bronchopleural fistula.
- 10- A 43 year old man consult you as he is producing a cupful of foul purulent sputum every day. Examination reveals digital clubbing and coarse crackles at the left base. What is the most likely diagnosis ?
- Bronchiectasis.
 - Acute lung abscess.
 - Bronchoalveolar cell carcinoma.
 - Sarcoidosis.
- 11- Clubbing is present in all EXCEPT :
- Fibrosing alveolitis.
 - Cystic fibrosis.
 - Emphysema.
 - Bronchiectasis.
- 12- Crepitations not influenced by coughing are found in :
- Acute pulmonary edema.
 - Pneumonia.
 - Fibrosing alveolitis.
 - Lung abscess.
- 13- Which of the following drugs is NOT used in acute asthma :
- Zafirlukast.
 - Terbutaline.
 - Corticosteroids.
 - Ipratropium bromide.
- 14- Which of the following occupations is associated with new onset asthma ?
- Paint sprayer.
 - Insulation installer.
 - Typist.
 - Truck driver.

In Capsule Series

Revision

15- Which of the following is the most common malignancy associated with asbestos exposure ?

- a) Pleural mesothelioma.
- b) Non-Hodgkin lymphoma.
- c) Bronchogenic carcinoma.
- d) Fibrosarcoma.

16- A pleural aspirate with diminished glucose concentration, excess lymphocytes, high specific gravity is characteristic of :

- a) Tuberculous effusion.
- b) Pneumococcal pneumonia.
- c) Asbestosis.
- d) Malignant lymphoma.

17- A patient with a superior mediastinal swelling, bilateral ptosis will benefit most from which of the following :

- a) Prostigmine.
- b) Corticosteroids.
- c) Thymectomy.
- d) Cholinergic drugs.

18- A patient with low grade fever and weight loss has decreased movement on the right side of the chest with decreased fremitus, dullness to percussion, and decreased breath sounds all on the right. The trachea is deviated to the left. The most likely diagnosis is :

- a) Pneumothorax.
- b) Pneumonia.
- c) Pleural effusion.
- d) Atelectasis.

19- Which is false regarding transudative pleural effusion :

- a) Protein < 3.0 g/100ml.
- b) Pleural fluid/serum LDH ratio < 0.6
- c) PH < 7.2
- d) Specific gravity < 1016

20- Which is example of exudative pleural effusion :

- a) Nephrotic syndrome.
- b) Constrictive pericarditis.
- c) SVC syndrome.
- d) Rheumatoid arthritis.

In Capsule Series

Revision

- 21- Commonest cause of hypertrophic osteoarthropathy is :
- a) Fallot's tetralogy.
 - b) Bronchiectasis.
 - c) Mesothelioma.
 - d) Bronchogenic carcinoma.
- 22- Which of the following drugs may produce pleural effusion :
- a) Losartan.
 - b) Miltefosine.
 - c) Amiodarone.
 - d) Propranolol.
- 23- Lovibond's angle is approximately :
- a) 120°
 - b) 140°
 - c) 180°
 - d) 160°
- 24- Pink, frothy, and profuse sputum is seen in :
- a) Pneumoconiosis.
 - b) Lobar pneumonia.
 - c) Acute pulmonary edema.
 - d) Aspergilloma.
- 25- Non-cardiogenic pulmonary edema is seen in all EXCEPT :
- a) Fulminant hepatic failure.
 - b) Hemorrhagic pancreatitis.
 - c) Deep sea diving.
 - d) Malignant malaria.
- 26- A patient with hemoptysis and having depressed bridge of the nose is diagnostic of :
- a) Rickets.
 - b) Wegner's granulomatosis.
 - c) Congenital syphilis.
 - d) Rhinocerebral mucormycosis.
- 27- Which of the following is not a paraneoplastic syndrome in bronchogenic carcinoma :
- a) Cachexia.
 - b) Hemoptysis.
 - c) Polymyositis.
 - d) SIADH

In Capsule Series

Revision

- 28- Regarding hypoventilation all are true EXCEPT :
- a) Occurs in severe kyphoscoliosis.
 - b) Hypoxemia.
 - c) Hypercapnia.
 - d) Hypoxemia is not corrected by 100% O₂.
- 29- Impaired diffusion is seen in all EXCEPT :
- a) Sarcoidosis.
 - b) Pleural mesothelioma.
 - c) Emphysema
 - d) Anemia.
- 30- Which does not belong to the triad of symptomatic bronchial asthma :
- a) Chest pain.
 - b) Dyspnea.
 - c) Wheeze.
 - d) Cough.
- 31- Caplan's syndrome is coal worker's pneumoconiosis associated with :
- a) SLE
 - b) Scleroderma.
 - c) Rheumatoid arthritis.
 - d) Ankylosing spondylitis.
- 32- Viral pneumonia may have :
- a) Signs of consolidation in chest.
 - b) Splenomegaly
 - c) High WBC count
 - d) Foul-smelling expectoration.
- 33- All are commonly seen in Legionella induced pneumonia EXCEPT :
- a) Cavitation
 - b) Hyponatremia
 - c) Proteinuria
 - d) Confusion
- 34- Asbestosis is NOT related to :
- a) Mesothelioma of peritoneum
 - b) Mesothelioma of pleura
 - c) Progressive massive fibrosis
 - d) Carcinoma of the lung.
- 35- Which is not common in primary pulmonary tuberculosis
- a) Cavity.
 - b) Fibrosis.
 - c) Lymphadenopathy.
 - d) Pleural effusion.

In Capsule Series

Revision

- 36- Which is not a bedside feature of fibrosing alveolitis
- a) Orthopnea
 - b) Anemia
 - c) Clubbing
 - d) Crepitations
- 37- Chronic respiratory failure is not seen in
- a) Diffuse interstitial fibrosis
 - b) Emphysema
 - c) Pneumothorax
 - d) Chronic bronchitis
- 38- Commonest middle mediastinal mass is
- a) Lymphoma
 - b) Aortic aneurysm
 - c) Bronchogenic cyst
 - d) Thymoma
- 39- commonest posterior mediastinal tumor is
- a) Neurofibroma
 - b) Lymphoma
 - c) Teratodermoid
 - d) Metastatic carcinoma
- 40- Commonest cause of superior mediastinal syndrome is :
- a) Lymphoma.
 - b) Thymoma.
 - c) Bronchogenic carcinoma.
 - d) Retrosternal goiter.
- 41- Which is false regarding Pickwickian syndrome
- a) Marked obesity
 - b) Hyperventilation
 - c) Somnolence
 - d) Right sided heart failure
- 42- The commonest benign pulmonary neoplasm is
- a) Lipoma
 - b) Adenoma
 - c) Fibroma
 - d) Hamartoma
- 43- investigations of highest diagnostic efficacy in acute pulmonary thromboembolism is
- a) ECG
 - b) Ventilation/perfusion lung scan
 - c) Spiral CT
 - d) Arterial blood gases.

In Capsule Series

Revision

- 44- High amylase in pleural fluid is found in all EXCEPT
- Esophageal rupture
 - Bronchogenic carcinoma
 - Sarcoidosis
 - Acute pancreatitis
- 45- Which is not a neurological paraneoplastic syndrome of bronchogenic syndrome
- Eaton-Lambert syndrome
 - Cerebral thrombosis
 - Retinal blindness.
 - Subacute cerebellar degeneration.
- 46- Which is not in the list of bedside severity assessment of bronchial asthma
- Kussmaul's sign
 - Pulsus paradoxus
 - Silent chest
 - Central cyanosis
- 47- Pure oxygen therapy may produce all of the following EXCEPT
- Acute lung injury
 - Respiratory depression
 - Fibrosis of the lung
 - Consolidation of the lung
- 48- Upper border of liver dullness is elevated in all EXCEPT
- Ascites
 - Right subdiaphragmatic abscess
 - Right pneumothorax
 - Right pleural effusion.
- 49- Commonest cause of respiratory failure is
- Emphysema
 - Fibrosing alveolitis.
 - Bronchial asthma.
 - Chronic bronchitis.
- 50- Acute lung injury (ARDS) should be differentiated from :
- Acute LVF
 - Congestive cardiac failure.
 - Acute severe asthma.
 - Spontaneous pneumothorax.
- 51- All are features of hypercapnia EXCEPT
- Capillary pulsation
 - Central cyanosis.
 - Papilledema
 - Asterixis.

In Capsule Series

Revision

- 52- Classic dermatological manifestation of chronic sarcoidosis is :
- a) Erythema nodosum.
 - b) Maculopapular rash
 - c) Lupus pernio
 - d) Subcutaneous nodules.
- 53- The most reliable symptom of acute pulmonary thromboembolism is
- a) Chest pain
 - b) Hemoptysis.
 - c) Breathlessness
 - d) Syncope
- 54- Pulmonary fibrosis is not produced by :
- a) Tuberculosis.
 - b) Cor pulmonale.
 - c) Progressive systemic sclerosis.
 - d) Rheumatoid arthritis.
- 55- Cranial nerve most commonly affected in sarcoidosis is :
- a) VII
 - b) II
 - c) V
 - d) X
- 56- Commonest cause of death in sarcoidosis is :
- a) Cor pulmonale.
 - b) Pneumonia.
 - c) Nephrocalcinosis.
 - d) Neurosarcoidosis.
- 57- Reactivation of pulmonary tuberculosis is due to :
- a) Malnutrition.
 - b) Low perfusion.
 - c) High ventilation.
 - d) Low PaO₂.
- 58- Commonest sign of aspiration pneumonia is :
- a) Stridor.
 - b) Tachypnea.
 - c) Central cyanosis.
 - d) Crepitations.
- 59- The dose of which antituberculous drug need not to be reduced in severe renal failure :
- a) Rifampicin.
 - b) INH.
 - c) Pyrazinamide.
 - d) Streptomycin.

In Capsule Series

Revision

60- Bronchial adenoma most commonly present as :

- a) Cough.
- b) Stridor.
- c) Recurrent hemoptysis.
- d) Chest pain.

61- Bradypnea is associated with :

- a) Narcotic overdose.
- b) Acidosis.
- c) Pneumonia.
- d) Acute lung injury.

62- Primary spontaneous pneumothorax is associated with :

- a) Tall & thin individuals.
- b) Non-smokers.
- c) Exercise.
- d) COPD.

63- Predominantly left sided pleural effusion is seen in :

- a) Congestive heart failure.
- b) Amebic liver abscess.
- c) Esophageal rupture.
- d) Liver cirrhosis.

64- Which of the anti-tuberculous drugs should be totally avoided in pregnancy :

- a) INH.
- b) Rifampicin.
- c) Ethambutol.
- d) Streptomycin.

65- The most common organism causing pneumonia during mechanical ventilation in the first 4 days of hospitalization is :

- a) Staph. aureus.
- b) Streptococcus pneumonia.
- c) Gram -ve bacilli.
- d) Hemophilus influenza.

66- Which of the following is NOT responsible for development of interstitial lung disease :

- a) Carbamazepine.
- b) Methotrexate.
- c) Amiodarone.
- d) Carbimazole.

67-Asbestosis may be complicated by all EXCEPT :

- a) COPD
- b) Mesothelioma of pleura.
- c) Bronchogenic carcinoma.
- d) Pulmonary fibrosis.

In Capsule Series

Revision

68- On examination of the chest of a patient with a unilateral tension pneumothorax, which of the following signs is present ?

- a) Chest wall movements are decreased on both sides.
- b) The mediastinum is pulled towards the affected side.
- c) Breath sound may be decreased or absent on the affected side.
- d) Tactile vocal fremitus will be increased on the affected side.

69- Concerning respiratory failure, Which of the following statements is true ?

- a) PaCO₂ is elevated in all types of respiratory failure.
- b) The commonest cause of type II respiratory failure is pneumonia.
- c) Pulsus paradoxus is a sign commonly associated with respiratory failure.
- d) It always presents with dyspnea.

70- A 65-year-old man presents with progressive shortness of breath with a history of heavy tobacco use. Breath sounds are absent on the left side of the chest. Percussion of the left chest reveals dullness. While you place your hand on the left side of the chest and have the patient say “ninety nine,” no tingling is appreciated in the hand. The trachea appears to be deviated toward the left. Which of the following diagnoses is most likely?

- a) Pneumonia
- b) Bronchial obstruction
- c) Pleural effusion
- d) Pneumothorax

71- Which of the following is a typical manifestation of chronic hyperventilation?

- a) Hypoxemia
- b) Hyperphosphatemia
- c) Tetany
- d) Clubbing

72- Which one of the following disorders characteristically produces type I respiratory failure ?

- a) Kyphoscoliosis.
- b) Guillan-Barre polyneuropathy.
- c) ARDS
- d) Inhaled foreign body in a major airway

73- All of the following are causes of an elevated hemidiaphragm EXCEPT :

- a) Laryngeal nerve paralysis.
- b) Surgical lobectomy.
- c) Subphrenic abscess.
- d) Pulmonary collapse.

74 - 77 :

- a) Chest x ray.
- b) arterial blood gas.
- c) CT chest.
- d) V/Q scan.
- e) Peak expiratory flow rate.
- f) FBC.

Which is the most appropriate investigation for each of the scenarios below ?

74- A 17 year-old girl has been admitted with acute onset shortness of breath believed by her GP to be a deterioration in her normally well controlled asthma. She has suffered with asthma since the age of 5 years & is normally well controlled, she has never had any hospital admissions. She usually takes regular salbutamol and beclomethasone.

75- A 27-year-old patient with a history of Marfan's disease presents to emergency with new onset shortness of breath. He has not had any recent illness and has not been exerting himself or playing any sports in the past couple of days. He is not complaining of cough but has noticed a small amount of right sided chest pain since the onset of the shortness of breath.

76- A 51-year-old lady has recently returned from holiday in Alex. Since her return she has noticed a minor pleuritic chest pain, which she thought would resolve with time. 2 days on, the pain is worsening and she has developed shortness of breath. On examination her saturation on room air is 89% , her chest is clear with good air entry & she has no swelling in her calves. D-dimer test is positive and chest X-ray normal.

77- A 41-year-old man is referred by his GP to the respiratory clinic for investigations of his worsening dyspnea & dry cough. He has no past respiratory history & his GP is concerned about finger clubbing, which he has noticed on routine examination. On auscultation of his chest he has noticed fine end inspiratory crepitations and chest X-ray shows a ground glass appearance.

Answers

1- b

2- b

3- d

4- d hemolytic anemia and Mycoplasma

5- b

6- c

7- a

8- d

9- b

10 – a

11- c

12- c

13- a

14- a

Isocyanates are examples of low molecular weight substances that induce asthma. These compounds are found in spray paint & plastics. Insulation installer may be exposed to asbestose, this would result in fibrosis rather than bronchospasm.

15- c

Although malignant mesothelioma is usually associated with a history of exposure to asbestos, it is a relatively uncommon malignancy. In contrast, the risk of bronchogenic carcinoma increases markedly with asbestos exposure (2-3 fold)

16- a

- The exudate, due to pneumococcal pneumonia has the same picture but contains instead of lymphocytes, polymorphonuclear leucocytosis.
- The exudate due to asbestosis is due to development of mesothelioma and is hemorrhagic & doesn't decreases the sugar content of the aspirate.
- In malignant lymphoma, the aspirate is the same as TB but the glucose level is not affected.

17- c

The patient has myasthenia gravis due to thymoma.

18- c

19- c

20- d

21- d

22- c

23- d

Lovibond's angle is the angle made at the meeting of the proximal nail fold and the nail plate when viewed from the radial aspect; normally, less than 165° but exceeding this in clubbing of the fingers.

24- c

25- c

26- b

27- b

28- d

In Capsule Series

Revision

29- b

30- a

31- c

32- b

33- a

34- c

35-a

36-b

37-c

38-b

39-a

40-c

41-b

42-b

43-b

44-c

45-b

46-a

47-c

48-c

49-d

50-a

51-b

52-c

53- c

54- b

55- a

56- a

57- c

58- b

59- a (**R**ifampicin → **R**enal failure ☺)

60- c

61- a

62- a

63-c

64-d

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65-a

66-d

67- a

68- c

69- c

70-b

This case is left lung collapse produced by an obstructed bronchus. A possible cause of obstruction and atelectasis of a large amount of left lung tissue could be obstruction of a major bronchus by carcinoma of the lung, especially in an older patient who is a heavy smoker.

71- c

72- c

73- a , phrenic nerve paralysis not laryngeal nerve ☺

74- e

75-a

76-d

77-c